Neustar's Response to the

NAPM LLC's Local Number Portability Administration 2015 Surveys

April 5, 2013

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REDACTED--FOR PUBLIC INSPECTION

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April 5, 2013

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Neustar is pleased to offer the enclosed response to the NAPM LLC's LNPA 2015 Surveys. We believe our submission is a thorough, reasoned, and compelling value-based proposal that provides the Industry with substantial savings, a high-performing and proven technical solution, unmatched industry expertise and management focus, and zero risk.

Neustar's proposal meets or exceeds all requirements set forth by the Industry, and contains all the relevant details to support Neustar's selection. Our formal proposal is divided into three sections:

Section 1—Technical Factors, provides a complete technical description of the total LNP administration service that Neustar is offering, including our deep commitment to system and data security. This section also describes several unique innovations that will deliver material value to the Industry and to consumers. Finally, this section highlights the risk and cost associated with transition of this critical service.

Section 2—Management Factors, provides comprehensive descriptions of our company, our structure, our sound financial and operational stability, our unrivaled Neutrality, our unmatched U.S. LNPA experience, and our successful track record of superior LNPA customer service.

Section 3—Pricing, describes the improved financial terms under which Neustar proposes to serve as LNPA in the next contract term. Included are descriptions of Neustar's proposed fixed fees, material Industry credits tied valuable innovation, terms for bundled SOWs, and reduced direct charges.

We look forward to answering any questions you may have about this proposal. Thank you for your consideration, and for the opportunity to extend our valuable partnership.

Sincerely,

Lisa A. Hook

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ACRONYMS

Acronym	Full Name
AIN	Advanced Intelligent Network
ASN.1	Abstract Syntax Notation 1
ATIS	Alliance for Telecommunications Industry Solutions
BOC	Bell Operating Company
CARE	Customer Account Record Exchange
CLASS	Custom Local Area Signaling Services
CLEC	Competitive Local Exchange Carrier
CLNPC	Canadian Local Number Portability Consortium
CMIP	Common Management Information Protocol
CNAM	Calling Number and Name
DPC	Destination Point Code (common channeling signaling node address)
EDR	Efficient Data Representation
FCC	Federal Communications Commission
FOC	Firm Order Confirmation (wireline)
FRS	Functional Requirements Specification (for the NPAC/SMS)
GDMO	Guidelines for the Definition of Managed Objects
GMT	Greenwich Mean Time
IIS	Inter-Operability Interface Specifications (for the NPAC/SMS)
ILEC	Incumbent Local Exchange Carrier
IN	Intelligent Network
INC	Industry Numbering Committee
ISO	International Organization of Standardization
IVR	Interactive Voice Response (e.g., law enforcement access to NPAC data)
LAN	Local Area Network
LATA	Local Access Transport Area
LEAP	Local Number Portability Enhanced Analytical Platform
LERG™	Local Exchange Routing Guide
LIDB	Line Information Database
LNP	Local Number Portability

Acronym	Full Name
LRN	Location Routing Number
LSMS	Local Service Management System
LSP	Local Service Provider
LSR	Local Service Request (wireline)
LTI	Low-tech Interface
MUMP	Mass Update Mass Porting
NANC	North American Numbering Council
NANP(A)	North American Numbering Plan (Administrator)
NAPM LLC	North American Portability Management, LLC
NAS	NANP Administration System
NECA	National Exchange Carrier Association
NPA	Numbering Plan Area
NPAC	Number Portability Administration Center (includes service and system)
NPAC/SMS	Number Portability Administration Center and Service Management System
NSAP	Network Layer Service Access Point
NSP	New Service Provider
OCN	Operating Company Number
ONSP	Old Network Service Provider
OSI	Open Systems Interconnect
OSP	Old Service Provider
OSS	Operations Support System
PA	Pooling Administrator
PAS	Pooling Administration System
PSAP	Public safety answering point
RBOC	Regional Bell Operating Company
RFI	Request for Information
RFP	Request for Proposal
RFQ	Request for Qualifications or Request for Quotation
RSA	A popular encryption algorithm whose name is derived from the initials of its inventors: Rivest, Shamir, and Adelman.
SCP	Service Control Point (common channeling signaling node address)
SIC-SMURF	Selection Input Criteria SPID Migration Update Request File
SMS	Service Management System

Acronym	Full Name
SMURF	SPID Migration Update Request File
SOA	Service Order Activation or Administration
SP	Service Provider
SPID	Service Provider Identification
SS7	System 7 (common channeling signaling network)
SSN	Subsystem Number (part of common channeling signaling node address)
SSP	Service Switching Point (node in the common channeling signaling network)
SV	Subscription Version
TCP/IP	Transmission Control Protocol and Internet Protocol
TN	Telephone Number
TSAP	Transport Layer Service Access Point
URI	Uniform Resource Identifier
WWW	World Wide Web

GLOSSARY

Word or Phrase	Definition
Activation Time Stamp	Date/Time Stamp of when the TN porting activation command was received by the NPAC SMS from the new Service Provider. This time stamp is also stored in the Local SMSs and SCPs to assist auditing.
Active like SVs	SVs that contain a status of sending, partial failure, old with a Failed SP List, or disconnect pending.
Alt SPID	The four-digit identifier of a second service provider associated with a telephone number or thousand block. It identifies the wholesale service provider customer to which the PSTN service provider has assigned the number. The second service provider in turn may either assign the number to its retail customer or to another service provider for its use.
Block ("thousand block")	A group of 1,000 contiguous telephone numbers in the range NPA-NXX-X000 through NPA-NXX-X999. Usually referred to as a "pooled bock" even when not actually assigned by the national number pooling administrator
Block Available	A thousand block that is not assigned to a service provider.
Block Contaminated	A thousand block that has working numbers. A block with any working numbers is contaminated, but as long as no more than 100 numbers in the block are working, the block is eligible for donation to the Pooling Administrator's thousand block pool.
Block-Assignee, -Holder,	The service provider to which the thousand block has been assigned by the Pool

Word or Phrase	Definition
-Owner	Administrator.
Class 1 Interconnected VoIP	A VoIP service provider that directly interfaces with the Public Switched Telephone Network and is eligible to receive numbering resource assignments from the NANPA and PA.
Class 2 Interconnected VoIP	A VoIP service provider that relies on a PSTN provider switch for access to the Public Switched Telephone Network and for telephone numbers to assign to its customers.
Class 3 Interconnected VoIP	A reseller of Class 1 or Class 2 Interconnected VoIP provider services.
Code-Assignee, -Holder, -Owner	The service provider to which an NPA-NXX code is assigned by the NANPA or the Pool Administrator.
Competitive Local Exchange Carrier (CLEC)	The landline carrier entrant to a market where there is already an incumbent LEC providing local phone service.
Custom Local Area Signaling Services (CLASS)	Identifies a group of vertical service features such as Caller ID (calling number delivery), Calling Name delivery, and call filtering (either to accept or to reject calls from specified numbers).
Dash-X	The Dash-X is shorthand for the NPA-NXX-X that represents the 1,000 numbers in a thousand block in the NPAC/SMS network data. Similarly, an NPA-NXX code is a network data level representation of 10,000 numbers.
Destination Point Code (DPC)	The DPC is the 9-digit portion of the 12-digit SS7 address which identifies a node in the signaling network (the 3-digit portion is the SSN). An address of a device on the Common Channel Signaling (SS7) network. The DPCs shown in the NPAC data refer to addresses of nodes such as the databases used in the provision of Collect/Third Party Billing and Calling Name Delivery services and central office switches, for which the address is needed to facilitate inter-switch voice mail system operation (used to route the Call Waiting indicator signal from the voice mail system to the called parties serving the switch) and to accommodate Auto-Recall/Auto-Call Return services.
Due Date (for a SV)	The Due Date is a date/time stamp on a subscription order that indicates the approximate date/time of activation. The actual activation of the subscription order is triggered by the Activation Request from the new SP. The Due Date will be used to determine when both new and old SPs should have sent their matching subscription orders, as well as for aging old unprocessed orders from the system. Subsequent changes to due date will not be required to match and will not trigger notification to other service providers.
Efficient Data Representation (EDR) within the NPAC	A storage mechanism where a 1K range of TNs is represented, stored, and communicated as a NPA-NXX-X rather than as a thousand individual TNs.
Federal Communications Commission (FCC)	U.S. government entity with the responsibility to direct the U.S. national telecommunications regulatory environment.
Firm Order Confirmation (FOC)	It is the verification/acknowledgment from one wireline SP to another SP of receipt of a valid Service Request. (The service request is an LSR if from wireline carrier; a WPR if from a wireless carrier.)

Word or Phrase	Definition
Incumbent Local Exchange Carrier (ILEC)	The local wireline service provider, either an RBOC or an Independent LEC, that served a market prior to the market being opened to competition.
Industry Numbering Committee (INC)	A standing committee of the ATIS that provides a forum to address and resolve industry-wide issues associated with planning, administration, allocation, assignment and use of the NANP numbering resources within the NANP area.
Interactive Voice Response (IVR)	The IVR is a dial-up service provided by the NPAC that is used by law enforcement agencies, public safety, and 911 service providers to retrieve current service provider information.
Intermodal Porting	Porting telephone numbers between wireline and wireless service providers.
IXC (Inter-Exchange Carrier)	A carrier that provides connections between local service providers when they do not have connection arrangements appropriate for a call. In particular, used when regulatory restrictions preclude delivery of a call across LATA boundaries. A LEC also may function as an IXC.
Last Alt SPID	The four-digit identifier of the last service provider associated with the telephone number. It identifies the last reseller in the service provider chain, i.e., the one that has the retail sales relationship with the consumer.
Line Information Database (LIDB)	One of the original uses is to allow a toll operator to determine whether a telephone number may be billed for a call (Collect or Third Number) by indicating whether the billed number is a public phone. Other uses include an indication that a number will accept all Collect calls, so it is not necessary to have an operator obtain agreement from the billed party on each call. (See also DPC).
LNP Inter-Service Provider Port (LSPP)	This "LNP Type" is the NPAC/SMS term for the number record resulting from an Inter-Service Provider Port. Ports between different SPIDs, even if the SPIDs represent the same service provider, are considered by the NPAC/SMS to be inter-service provider ports.
LNP Type	The NPAC/SMS database classifies porting activity into three types: • LNP Type 1 - LSPP - inter-service provider port - a number that has been ported between two different SPIDs • LNP Type 2 - LISP - intra-service provider port - a number that has been ported within the same SPID • LNP Type 3 - POOL - a number contained in a pooled thousand block
Local Access Transport Area (LATA)	The geographic region beyond which a former BOC, and certain independent LECs, cannot transport a call without involving an IXC.
Local Area Network (LAN)	A group of client computers connected to a server.
Local Exchange Carrier (LEC)	A company that provides local wireline telephone service.
Local Exchange Routing Guide (LERG™)	A database owned by Telcordia. It provides information at the NPA-NXX and NPA-NXX-X level, not at the TN-level such as provided by the NPAC database.
Local Intra-Service	This "LNP Type" is the NPAC/SMS term for the SV resulting from an Intra-Service

Word or Phrase	Definition
Provider Portability (LISP)	Provider Port, i.e., the movement of a TN from one switch to another but within the same Service Provider's Network. Ports between different SPIDs, even when both SPIDs represent the same service provider, are not considered by the NPAC/SMS to be intra-SP ports, however.
Local Number Portability (LNP)	The FCC-ordered capability for a consumer to be able to retain his telephone number when changing service providers. The "local" refers to the limited area of portability: the rate area associated with the telephone number cannot change as the result of a port. The first six digits of a telephone number, the NPA-NXX, indicate the rate area associated with a telephone number whether or not the number has been ported.
Local Number Portability Enhanced Analytical Platform (LEAP)	A subscription-based, online portal which allows law enforcement agencies to retrieve information on numbers.
Local Service Management System (LSMS)	The system which receives data broadcast from the NPAC/SMS. The LSMS provisions the service provider's downstream systems, such as its LNP call routing database. The LSMS is a mechanized system used (primarily) to receive data broadcasts from the NPAC/SMS.
Local Service Provider (LSP)	A company that provides local telephone service. The term is used to describe the service provider having the retail relationship with the consumer.
Local Service Provider Portability (LSPP)	This "LNP Type" is the NPAC/SMS term for the SV resulting from an Inter-Service Provider Port, i.e., the movement of a TN from a switch associated with one SPID to a switch associated with a different SPID. Ports between different SPIDs, even when both SPIDs represent the same service provider, are considered by the NPAC/SMS to be inter-SP ports
Local Service Request (LSR)	The service request to port a number, sent from one SP to another. (LSR if sent from a wireline carrier; WPR if sent from a wireless carrier).
Location Routing Number (LRN)	A 10-digit number used to uniquely identify a switch that can serve ported or pooled numbers. The first six digits of the LRN is a valid NPA-NXX assigned to the switch that serves the ported or pooled numbers. An LNP-enabled switch interrupts processing of an originating call to determine whether the called number is ported and to obtain the called number's LRN if the number is ported (or pooled). Calls to a non-ported number are routed based on the NPA-NXX of the called number. Calls to a ported (or pooled) number are routed instead based on the NPA-NXX of the number's associated LRN.
Low-tech Interface (LTI)	A manual system used to submit data to the NPAC/SMS.
Mass Update Mass Porting (MUMP)	A method of creating, modifying, and deleting large quantities of SVs without using the standard NPAC/SMS interfaces or the Help Desk.
Mechanized Interface	The term refers to the NPAC/SMS interface for both the LSMS that receives the data broadcasts from the NPAC/SMS and the SOA that sends data to the NPAC/SMS.
N-1 ("N minus 1")	The next to last network involved in a particular call. In the case of an inter-LATA toll call, for example, the next to last network is the IXC network. The determination of the destination network (and switch) for a ported number is expected to be performed before the call is delivered to the network containing the switch serving the called number. The determination is made by the N-1 network if it has not been made earlier in the call path.

Word or Phrase	Definition
NANP Administrator (NANPA)	The neutral, third-party entity selected by the FCC to administer the NANP.
New Network Service Provider (NNSP)	The NNSP is the service provider operating the switch to which the consumer's telephone number is moving. The NSP is the new service provider to which the consumer is moving and with which the consumer has a retail relationship. The two terms can represent the same entity. However, if the consumer is moving to a "reseller" then the reseller is the NSP and the PSTN switch operator is the NNSP
New Service Provider (NSP)	The NSP is the new service provider to which the consumer is moving and with which the consumer has a retail relationship.
North American Numbering Council (NANC)	The NANC was established by the FCC October 5, 1995 to provide advice and recommendations to the FCC and other governments (including those of Canada and the Caribbean countries) on numbering issues. NANC members include representatives from local exchange carriers [wireline carriers], interexchange carriers, wireless providers, manufacturers, state regulators, consumer groups, and telecommunications associations.
North American Numbering Plan (NANP)	The NANP is the plan for telephone numbers in Canada, the US and its territories, and the Caribbean. Telephone number addresses in the NANP are in the form NXX-NXX-XXXX, where N is any digit from 2-9 and X is any digit from 0-9. (The format often is expressed as NPA-NXX-XXXX to reflect the fact that the first three digits of the telephone number represent the area code.) The first six digits (NPA-NXX) of the telephone number identify the local serving switch. The NPA-NXX of a telephone number also indicates the geographic area ("rate area") associated with the number. There are exceptions to the meaning of a number's NPA-NXX, such as for "toll-free" numbers and those in certain specially designated NPA-NXXs.
North American Portability Management, LLC (NAPM LLC)	The private entity with which Neustar contracts to provide the NPAC services in the U.S. The NAPM LLC is recognized by the FCC as representing the interests of the industry with respect to number portability. The NAPM LLC membership is limited to representatives of service providers subject to the FCC's LNP mandates.
NPAC Customer/User	A User is an entity that has signed a User Agreement with the NPAC. Not all Users actually interact with the NPAC and thus not all Users are a customer of the NPAC.
NPAC Service Provider Identity (NPAC SPID)	A four-digit alpha-numeric value that identifies the owner of a record in the NPAC/SMS. The SPID is an NPAC account number and in most cases is drawn from the NPAC User's OCN. The SPID of the owner of a record is included in the data broadcast to the LSMSs.
NPA-NXX	The first six digits of a NANP telephone number (or of an LRN). The NPA-NXX is the PSTN address of the switch serving the telephone number. In a non-pooling area, the NPA-NXX code and the associated 10,000 numbers are assigned by the NANPA. In a pooling area, the NPA-NXX code is assigned by the Pool Administrator along with one or more thousand blocks drawn from the NPA-NXX. Other thousand blocks drawn from the NPA-NXX are assigned by the PA and can be used in switches other than the one to which the NPA-NXX itself is assigned.
NPA-NXX-X	Representation of a pooled block. A range of 1000 pooled TNs within the NPA-NXX, beginning with X000 and ending with X999, where X is a value between 0 and 9. Pooled TNs require LRN routing unless their block is assigned to the switch to which

Word or Phrase	Definition
	the block's NPA-NXX also is assigned
Number Plan Area (NPA)	An NPA code is the first three digits of a 10-digit telephone number within the North America Numbering Plan Area. An NPA is always contained within the boundaries of a single state.
Number Portability Administration Center (NPAC)	Number Portability Administration Center is operated by a neutral third party, selected by the NAPM LLC for U.S. service and by the CLNPC for Canadian service. The NPAC performs administration functions for LNP. The term NPAC refers to the entire operation: both personnel and equipment. However, the term "NPAC SMS" sometimes is used interchangeably with the term "NPAC.
Number Portability Administration Center and Service Management System (NPAC/SMS)	The system used by the NPAC to manage number portability processes and information. The term "NPAC/SMS" is used to refer specifically just to the NPAC hardware/software, however, sometimes the term is used to represent the entire NPAC operation. The regional SMS is the HW/SW platform for an Operations Support System that performs administration functions for the Local Number Portability Service. It is the master database for ported TNs.
NXX	Term used typically to represent the 4th-6th digits of the ten-digit telephone number (N = any digit 2-9, X = any digit 0-9). Also representation of the 1st-3rd digits of the ten-digit telephone number
Old Network Service Provider (ONSP)	The ONSP is the service provider operating the switch from which the consumer's telephone number is moving. The OSP is the new service provider from which the consumer is moving and with which the consumer has a retail relationship. The two terms can represent the same entity. However, if the consumer is moving from a "reseller" then the reseller is the OSP and the PSTN switch operator is the ONSP.
Old Service Provider (OSP)	The term used to describe the service provider from which the consumer is moving and with which the consumer had a retail relationship
Open Code	The term refers to NPA-NXX codes that have been opened in the network data of the NPAC/SMS. A code must be open in the NPAC/SMS in order to allow numbers in that code to be ported or pooled. A list of open codes is provided in the public area of the NPAC web site. Note that a code may be open in NPAC solely to allow number pooling or to facilitate the use of pseudo-LRNs, i.e., porting may not yet be available for that code even though it is open in NPAC.
Operating Company Number (OCN)	The OCN is assigned by NECA and is used as an identifier for inter-carrier transactions. The OCN of a service provider is used as its NPAC SPID.
Pending-like SVs	SVs that contain a status of pending, conflict, cancel-pending, or failed.
Pooled Block	See Block
Pooled Block-Assignee, -Holder, -Owner	The service provider to which a thousand block is assigned by the Pool Administrator.
Pooling	Allows the assignment of numbers in blocks of 1,000 rather than requiring all 10,000 numbers to be assigned to the service provider to which an NPA-NXX is assigned
Pooling Administration System (PAS)	A web-based application that enables service providers to manage their numbering resources.
Pooling Administrator	The neutral, third-party entity selected by the FCC to administer national number

Word or Phrase	Definition
(Pooling Administrator)	thousands-block pooling.
Portable Code	NXX code from which telephone numbers may be ported.
Ported TN	A TN ported to a switch that is not the switch to which the number's NPA-NXX is assigned.
Pre-Port	Porting of an entire block of TN's from the code holder to the block holder on, or after, the effective date of the pool. This is supported by the National Number Pooling architecture.
Pseudo-LRN	A valid LRN is required when a number cannot be routed based on its dialed digits, so an NPAC record is created to show the LRN for that ported (or pooled) number. However, some number records are established in the NPAC/SMS for reasons other than a need for LRN-based routing. Some service providers find in such cases that the use of an intra-SP port to create a conventional NPAC/SMS record, i.e., one containing a valid LRN, is not feasible operationally. Instead a record is created containing a pseudo-LRN, i.e , an LRN with a value of 000-000-0000 in the LRN field in lieu of a valid LRN. The digit string in the LRN field of pseudo-LRN records means only that the number should be routed on dialed digits; that is, it is an instruction, not a route choice.
Public Switched Telephone Network (PSTN)	The closed network consisting of interconnections between voice switching nodes identified by national number plans such as the NANP (the plan used for telephone numbers in Canada, the United States and its territories, and the Caribbean). Other network arrangements such as the internet and private networks also interact with PSTN traffic, but rely on the PSTN switching nodes for their access to the PSTN.
Rate Area	Allows a consumer's service location to be defined for purposes such as defining local calling plans and calculating distances to rate long distance calls. (Note: Distance is no longer a component of pricing most toll calls.) It is a geographic area represented by a single point (the "rate center"). The distance between the calling party's rate center and the called party's rate center is used to represent the distance between the two parties. Each NPA-NXX in the NANP (except special purpose codes such as those used for "toll free" numbers) is associated with a rate area. Porting a number has no impact on its rate area association.
Rate Center	Geographic points assigned V & H coordinates between which distances are determined for billing and rating purposes. A rate area has a single point representative of all (wireline) TN service locations within the rate area. Large rate centers may have multiple points, used to calculate distances on calls to nearby rate areas.
Regional Bell Operating Company (RBOC)	An RBOC is a combination of Bell operating companies. Seven RBOC's were formed as a result of the AT&T divestiture.
Selection Input Criteria SPID Migration Update Request Files (SIC-SMURF)	Files created by the NPAC SMS and used by NPAC and Service Providers to update their databases independently during an NPAC maintenance window to reflect a SPID migration.
Service Bureau (SB)	Third-party users of NPAC data that relay data between the NPAC and their clients.
Service Control Point (SCP)	Service Control Point. Transaction processor-based system that provides common channel signaling network interface to database services. Node in a common channel signaling network.

Word or Phrase	Definition
Service Management System (SMS)	Used to manage records in a database. In the LNP context, the local SMS (LSMS) receives broadcasts from the NPAC SMS and updates the LSMS operator's downstream databases.
Service Order Administration (SOA)	The mechanized device interfaces to the NPAC SMS to create, modify, or delete NPAC SMS records. For example, a record must be created when a consumer ports his number.
Service Portability	Service is not portable from one carrier to another. The term is used when a consumer remains with his service provider but changes his service, such a moving from POTS to ISDN
Service Provider (SP)	A Service Provider that provides telecommunication services. Some examples of service providers are: • Local Service Provider • Long Distance Service Provider • SCP/SMS Service Provider • Directory Services/Operator Service Provider • Non-facilities-based Service Provider (e.g., Reseller) In the context of the NPAC, a Service Provider is an entity that is assigned numbering resources – codes and thousands blocks – by the NANPA or PA. For example, a Directory Services provider is not an SP. An SP can create, modify, and delete the NPAC records it owns.
Service Provider Portability (SPP)	The ability to port TNs when moving from one Local Service Provider to another
Service Switching Point or service switch point (SSP)	Service Switching Point or service switch point. A switching office that has the SSP features, enabling interactions with SCPs. A node in the common channel signaling network.
Signal Transfer Point (STP)	A Signaling point in the Common Channel Signaling network with the function of transferring signaling messages from one signaling link to another. A packet switch that transmits messages between switches and other network components. Also transmits messages between switches in the process of normal call set-up and routing. Its function is analogous to a tandem switch in the PSTN. A node in the common channel signaling network.
Signaling System 7 (SS7)	An internationally standardized, general-purpose Common Channel Signaling protocol. It defines the signaling backbone for the public switched telephone network.
Sub System Number (SSN)	Used as part of a DPC address on the SS7 network. (See DPC.)
Subscription	Information record for a TN
Subscription Version (SV)	The TN-level record stored in the NPAC/SMS (and broadcast to LSMSs) that contains routing and other information for a telephone number that is ported or pooled (or has a pseudo-LRN).
SV Type	Identifies the type of service associated with the telephone number or pooled block. Categories are: Wireline, Wireless, Class 2 VoIP, VoWIFI (Voice over WiFi), Pre-paid Wireless, Class 1 VoIP.

Word or Phrase	Definition
Switch	A device that can be controlled to interconnect two circuits. The local central office switch is used to provide the numbers it serves with the ability to be connected with any other number in the PSTN, i.e., it is the interface to the PSTN for the consumers it serves.
Thousands Block	(See Block)

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Vendor Qualification Survey Cross Reference/Compliance Matrix

VQS Ref	Abbreviated Requirements/Instructions	Neustar Response Reference	Neustar Will Meet/ Exceed Requirements
1.1	Introduction and Purpose—Informational Only	[redacted]	NA
1.2	Local Number Portability—Informational Only	NA	NA
1.3	Vendor Qualification Response Instructions—Informational Only	NA	NA
1.4	Treatment of Information and confidentiality—Informational Only	NA	NA
1.5	RFP Process Time Line—Informational Only	NA	NA
1.6	Iasta Tool Training/Abbreviations and Terminology—Informational Only	NA	NA
1.7	Respondent Acknowledgement	NA	Yes
2.	General Vendor Company Information—Header Only	2.0 Management Factors	NA
2.1	Please provide detail of the types of businesses or different lines of business in which the Respondent is engaged, including the percentages and revenues from each such type or lines of business.	Iasta Tool, Proposal 2.1 Corporate Experience	Yes
2.2	Provide Company name, address, POCs (primary and secondary) and POC information	Iasta Tool, Cover Letter	Yes
2.3	Is above address AR too?	Iasta Tool	Yes
2.4	Please provide details of the ownership and organizational structure, including affiliates and subsidiaries, of the Respondent, including a listing of all Officers and members of the Board of Directors.	Iasta Tool Attachment	Yes
2.5	How many years has the Respondent been in business? ... name(s).	Iasta Tool	Yes
2.6	Publicly traded or privately held	Iasta Tool	Yes

VQS Ref	Abbreviated Requirements/Instructions	Neustar Response Reference	Neustar Will Meet/ Exceed Requirements
2.7	If the Respondent is publicly traded, please provide the stock symbol and the exchange where the Respondent's stock is traded.	Iasta Tool	Yes
2.8	Total number of employees	Iasta Tool	
3.	Vendor Qualification Criteria Header Only	NA	NA
3.1	Information Only	NA	NA
3.2	Financial Responsibility and Stability (capability to perform for the duration of the Master Agreement)	Iasta Tool attachment, Proposal Section 2.2 Neustar's Financial and Operational Stability	Yes
3.3	LNP Experience Header Only		NA
3.3.1	LNP Experience	Proposal Section 2.1 Corporate Experience and 2.4 LNP Expertise	Yes
3.3.2	Identify and describe all threatened, pending, or concluded lawsuits	Iasta Tool Attachment	Yes
3.3.3	Identify and explain any other instances of terminations of contracts....	Iasta Tool Attachment	Yes
3.3.4	Provide three current client	Iasta Tool Attachment	Yes
3.3.5	Past Performance Questionnaire—Information Only	Sent to Dan Scuillo	Yes
3.3.6	List three large client or customer	Iasta Tool Attachment	Yes
3.3.7	Provide three client or customer contacts.. terminated business	Iasta Tool	Yes
3.4	Neutrality Header Only	NA	NA
3.5	Neutrality Audit	Iasta Tool, Proposal Section 2.3, Neustar's Neutrality	Yes
3.6	Acceptance of Key Business Terms and Conditions		
3.6.1	Question 1: .. remedies and recourse for any failure by the Primary Vendor to provide the NPAC/SMS and the Services at or above	NA	Yes

VQS Ref	Abbreviated Requirements/Instructions	Neustar Response Reference	Neustar Will Meet/ Exceed Requirements
	the Service Level Requirements. ...		
3.6.2	Question 2: The LNPA shall be compensated solely and exclusively from payments by Users pursuant to uniform and nondiscriminatory ..	NA	Yes
3.6.3	Question 3: The LNPA must post a Performance Bond or equivalent Letter of Credit or other instrument	3.5, Enhanced Guarantees	
3.6.4	Question 4: The LNPA shall monitor its compliance with all Service Level Requirements ...	1.2.2, NPAC/SMS 1.3 Neustar's Approach to Operational Excellence	Yes
3.6.5	Question 5: The LNPA must agree to submit to a Gateway Evaluation Process (GEP) ...	1.1 LNPA Services, 1.3 Neustar's Approach to Operational Excellence, 3.5 Enhanced Guarantees	Yes
3.6.6	Question 6: The NAPM LLC shall have the right to terminate...	NA	Yes
3.6.7	Question 7: ... effect the orderly transition of Services...	NA	Yes
3.6.8	Question 8 : .. The NUE Process	1.1, Administration Services, 1.3 Neustar's Approach to Operational Excellence	Yes
3.6.9	Question 9: ..appropriate license rights	NA	Yes
3.6.10	Question 10: ... deposit all technology and other ...	NA	Yes
3.6.11	Question 11: .. obtain and maintain all licenses, ...	NA	Yes
3.6.12	Question 12: The LNPA shall organize itself by division, ...	3.7 Additional Qualification	No
3.6.13	Question 13 : ... Statements of Work ...procedure and process	NA	Yes
3.6.14	Question 14: disaster recovery and backup plans..	1.2.4 NPAC/SMS Disaster Recovery, Backup, and Business Continuity	Yes
3.6.15	Question 15: servers and data centers and NPAC/SMS User Data must be maintained and stored in the continental United States	1.2.1, Data Center Layer, 1.2.1.4 and 5, Database and SAN Layer, 1.4 Security	Yes
3.6.16	Question 16. .. not granting any exclusive right to provide Services in any Region.	NA	Yes

VQS Ref	Abbreviated Requirements/Instructions	Neustar Response Reference	Neustar Will Meet/ Exceed Requirements
3.6.17	Question 17... a Most Favored Customer...	NA	Yes
3.6.18	Question 18: User Data shall be maintained as confidential...	NA	Yes
3.6.19	Question 19: ... to indemnify and hold harmless ...	NA	Yes
3.6.20	Question 20: .. defend or settle, at its own expense, any and all claims and suits against ...	NA	Yes
3.6.21	Question 21... shall obtain and maintain, with financially reputable insurers (i.e., carriers with an A.M. Best rating of A- :VIII, or better)	NA	Yes
3.6.22	Question 22: shall submit a list of all Sub-Contractor(s), ...	NA	Yes
3.6.23	Question 23: ..shall not have the right to assign any obligations, rights, duties or responsibilities ...	NA	Yes
3.6.24	Question 24: The governing law ... State of Delaware	NA	Yes
3.6.25	Question 25 : ... bound by binding arbitration in the state of Colorado ...	NA	Yes
3.6.26	Question 26: ... does not pass a mutually agreed upon Acceptance Plan set forth in the Master Agreement ..	NA	Yes
3.6.27	.. limitations on liability under the Master Agreements ...	NA	Yes
3.6.28	Question 28: ... adopt and comply .. delivery schedule ..	NA	Yes
4	Next Steps-Header Only	NA	NA
4.1	Conclusion: Information Only	NA	NA

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Request for Proposal Cross Reference/Compliance Matrix

RFP Ref	Abbreviated Requirements/Instructions	Neustar Response Reference	Neustar Will Meet/ Exceed Requirements
1.1	Introduction and Purpose Information Only	NA	NA
1.2	Vendor RFP Response Instructions Information Only	NA	NA
1.3	Treatment of Information and Confidentiality Information Only	NA	NA
1.4	LNP Information Only	NA	NA
1.5	RFP Vendor Selection Process Time Line	NA	NA
1.6	Iasta SmartSource Tool Training, Abbreviations and Terminology	NA	NA
1.7	Respondent Acknowledgment	Iasta Tool	
2.	Vendor Qualification Criteria—Header Only	NA	NA
2.1	Information Only	NA	
2.2	Has the Respondent answered every question in the 2015-LNPA-VENDOR QUALIFICATION survey?	Iasta Tool	Yes
3	Technical Requirements Document—Header Only	NA	NA
3.1	.. every question in the TRD survey and attached a summary...	Iasta tool, attachment Proposal Section 1.2, NPAC/SMS Overview	Yes
3.2	TRD—Information Only	NA	Na
4.	Vendor Performance Audits—Header Only	NA	Na
4.1	Gateway Evaluation Process (GEP)...	1.3 Neustar's Approach to Operational Excellence	Yes
4.2	Neutrality	1.3 Neustar's Approach to Operational Excellence, 2.3 Neustar's Neutrality	Yes
4.3	Business Continuity Plan Requirements	Iasta Tool, Section 1.2.4 NPAC/SMS Disaster Recovery, Backup, and Business Continuity	Yes

RFP Ref	Abbreviated Requirements/Instructions	Neustar Response Reference	Neustar Will Meet/ Exceed Requirements
4.4	LNPA NPAC/SMS Data Center Operations Audit....	1.3 Neustar's Approach to Operational Excellence	Yes
4.5	User Charges Audit	1.3 Neustar's Approach to Operational Excellence	Yes
4.6	Benchmarking Process	1.3 Neustar's Approach to Operational Excellence	Yes
5.	NUE Process--Header Only	NA	NA
5.1	Determination of Who Can Access the NPAC/SMS	1.1.1. Manage the User Administration Process	Yes
6.	Number Portability Administration Center---Heading Only	NA	NA
6.1	Overview of the Role and Responsibility of the LNPA to the NPAC and NPAC/SMS	NA	NA
6.2	User Support and User Training	1.1.3 Address User Support Needs, 1.1.4. Provide Industry Training	Yes
6.3	Acceptance Testing	1.1.5 Support Industry Testing, 1.2.2 NPAC/SMS Functionality	
6.4	NPAC/SMS Data Center Redundancy Requirements	1.2.1.1 NPAC/SMS Data Center Layer, 1.2.2.1 Functionality that Enables NPAC Transactions, 1.2.4 NPAC/SMS Disaster Recovery, Backup, and Business Continuity Planning	Yes
6.5	Help Desk Minimum Requirements	1.1.3 Address User Support Needs	Yes
6.6	Test Bed Requirements	1.1.5 Support Industry Testing, 1.2, NPAC/SMS Overview, 1.2.2 NPAC/SMS Functionality	Yes
6.7	Data Center Security	1.2.1.1. NPAC/SMS Data Center Layer, 1.4, Neustar's Security Program	Yes
6.8	Additional LNPA Support Requirements	1.1 LNP Administration Services, 1.2.2. NPAC/SMS Functionality, 1.2.3 NPAC/SMS Monitoring, 1.2 NPAC/SMS Overview	Yes
6.9	Interactive Voice Response (IVR) Requirements	1.1.9 Provide IVR Services	Yes

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RFP Ref	Abbreviated Requirements/Instructions	Neustar Response Reference	Neustar Will Meet/ Exceed Requirements
6.10	Outage Escalation and Root Cause Analysis Reports	1.1.12 Monitor the Ecosystem—Service Management, 1.2.3 NPAC/SMS Monitoring, 1.2.4 NPAC/SMS Disaster Recovery Backup, BCP	Yes
7.	Required Enhancements and Future Considerations—Header Only	NA	NA
7.1	Required Enhancements and Future Considerations—Information Only	NA	NA
7.1.1	Alternative Interface	1.2.1.3 NPAC/SMS Application Layer	Yes
7.1.2	Support of IPv6	1.2.2.3 New Functionality for the Next Term	Yes
7.1.3	Elimination of NPAC/SMS support of Non-EDR	1.2.2.3 New Functionality for the Next Term	Yes
7.2	Future Considerations—Header Only	NA	NA
7.2.1	Automation of processes between the NPAC/SMS and the Pooling Administration System (PAS)	1.2.2.3 New Functionality for the Next Term	Yes
7.2.2	Combining steps for Intra-Service Provider ports	1.2.2.3 New Functionality for the Next Term	Yes
7.2.3	Inter-carrier Communications	1.2.2.3 New Functionality for the Next Term	Yes
7.2.4	Future Mandated Changes	3.7 Additional Qualifications	No
7.2.5	PSTN to IP Transition	1.2.2.3 New Functionality for the Next Term	Yes
7.3	Required Enhancements and Future Considerations Response	1.2.2.3 New Functionality for the Next Term	
7.4	Additional Information Regarding Cloud Computing - Optional	1.2 Technical Design	NA
7.5	Additional Information Regarding Web Services Interface - Optional	NA	NA
8.	NANC LNP Process Flows Header Only	NA	NA
8.1	NANC LNP Process Flows	NA	Yes
9.	Service Level Requirements for Measurement and Reporting Header Only	NA	NA

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RFP Ref	Abbreviated Requirements/Instructions	Neustar Response Reference	Neustar Will Meet/ Exceed Requirements
9.1	Service Level Requirements for Measurement and Reporting	1.0 Technical Factors, 1.1 LNP Administration, 1.2 and subsections 1.3 Neustar's Approach to Operational Excellence	Yes
9.2	Table of Contents for SLRs	NA	NA
9.3	Summary of NPAC/SMS Service Level Requirements	NA	NA
9.4	SLR 1 - Service Availability	See 9.1 above	Yes
9.5	SLR 2 - Scheduled Service Unavailability	See 9.1 above	Yes
9.6	SLR 3 - Partial Service Unavailability	See 9.1 above	Yes
9.7	SLR 4 - LSMS Broadcast Time	See 9.1 above	Yes
9.8	SLR 5 - SOA to NPAC Interface Transaction Rates	See 9.1 above	Yes
9.9	SLR 6 - NPAC to LSMS Interface Transaction Rates	See 9.1 above	Yes
9.10	SLR 7 - SOA/LSMS Interface Availability	See 9.1 above	Yes
9.11	SLR 8 - Unscheduled Backup Cutover Time	See 9.1 above	Yes
9.12	SLR 9 - NPAC/SMS Partial Disaster Restoral Interval	See 9.1 above	Yes
9.13	SLR 10 - NPAC/SMS Full Disaster Restoral Interval	See 9.1 above	Yes
9.14	SLR 11 - Administration of any NPAC/SMS Tables	See 9.1 above	Yes
9.15	SLR 12 - User Problem Resolution, Speed of Answer	See 9.1 above	Yes
9.16	SLR 13 - User Problem Resolution, Abandoned Call Rate	See 9.1 above	Yes
9.17	SLR 14 - User Problem Resolution, After Hours Callbacks	See 9.1 above	Yes
9.18	SLR 15 - User Problem Resolution, Commitments Met	See 9.1 above	Yes
9.19	SLR 16 - Logon Administration, Timely Request Processing	See 9.1 above	Yes
9.20	SLR 17 - System Security, Security Error Log	See 9.1 above	Yes
9.21	SLR 18 - System Security, Remedy Invalid Access Event	See 9.1 above	Yes

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RFP Ref	Abbreviated Requirements/Instructions	Neustar Response Reference	Neustar Will Meet/ Exceed Requirements
9.22	SLR 19 - NPA Split/Mass Changes	See 9 1 above	Yes
9.23	SLR 20 - Unscheduled Service Unavailability Notification - Upon Detection	See 9.1 above	Yes
9.24	SLR 21 - Unscheduled Service Unavailability Notification - Update	See 9.1 above	Yes
9.25	...adherence to ALL SLRs shown in the RFP sections 9.4 thru 9.24 are incorporated into its proposal?	See 9.1 above	Yes
10.	NPAC User Methods & Procedures—Header Only	NA	NA
10.1	NPAC User Methods and Procedures	1.1 LNP Administration Services	Yes
11.	Other LNPA Services—header only	NA	NA
11.1	Intermodal Ported Telephone Number Identification Service	1.1.7 Validate Information for Law Enforcement Agencies and Telemarketers	Yes
11.2	Enhanced Platform for Law Enforcement Agencies and Public Safety Answering Point Providers	1.1.7 Validate Information for Law Enforcement Agencies and Telemarketers	Yes
11.3	LNPA Reports to NAPM LLC	1.1.11 Industry Reporting	Yes
11.4	LNPA Reports to FCC	1.1.11 Industry Reporting	Yes
12.	Miscellaneous Requirements—Header Only	NA	NA
12.1	Vendor Code of Conduct	Iasta Tool Proposal Section 2.3 Neutrality	NA
12.2	User Satisfaction Survey	Iasta Tool Proposal Section 2.5 Neustar's Record of Customer Service	NA
12.3	Transition and Implementation Plan	1.6 Transition and Implementation	Yes
13.	Pricing and Contract Terms—Header Only	NA	NA
13.1	Term of the Master Agreements in Each Region	3.7 Additional Qualifications	Yes

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RFP Ref	Abbreviated Requirements/Instructions	Neustar Response Reference	Neustar Will Meet/ Exceed Requirements
13.2	Failure to Meet Requirements and Conditions of the NPAC/SMS Each Master Agreement in each Region	NA	Yes
13.3	Payment Terms ...	3.7 Additional Qualifications	Yes
13.4	Pricing Model	Proposal Section 3.0 (in toto)	Yes
13.5	Most Favored Customer	NA	Yes
13.6	Best and Final Offer	NA	Yes
14	Submitting Bids Header Only	NA	NA
14.1	Bid Process Overview	1.6, Transition and Implementation, 3.6 National Solution	
14.1.1	Evaluation Criteria	Entire Proposal Response arranged according to evaluation criteria	Yes
14.2	Allocable Charges	Iasta Tool, Proposal Section 3.0 Pricing and 3.1 Allocable Charges	Yes
14.3	Direct Charges	Iasta Tool, Proposal Section 3.4 Direct Charges	Yes
15	Optional Attachments Header only	NA	NA
15.1	(OPTIONAL) Attach any supplemental documentation here.	Neustar's Technical, Management, and Price Proposal in response to VQS, RFP, and TRD Surveys	Yes
16	Next steps—Header only	NA	NA
16.1	Next Steps	NA	NA

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Technical Requirements Document Cross Reference/Compliance Matrix

TRD Ref	Abbreviated Requirements/Instructions	Neustar Response Section	Neustar Will Meet/ Exceed Requirements
1.1	TRD Introduction and Purpose	NA	NA
1.2	Vendor TRD Response Instructions ... Information Only	NA	NA
1.3	Backwards Compatibility Requirement	NA	Yes
1.4	Treatment of Subsequent NANC Change Orders	NA	Yes
1.5	TRD FRS Section 1: Introductio	NA	Yes
2.0	TRD FRS Section 2: BUSINESS PROCESS FLOWS	NA	Yes
2.1	TRD FRS Section 2: Business Process Flows	NA	Yes
3.0	TRD FRS Section 3: NPAC DATA ADMINISTRATION—Header Only	NA	NA
3.1	TRD FRS Section 3: NPAC Data Administration	NA	Yes
3.2	TRD FRS Section 3: Sub Section 3.2: NPAC Personnel Functionality	NA	Yes
3.2.1	TRD FRS Section 3: Sub Section 3.2.1: Block Holder, Mass Update	NA	Yes
3.2.2	TRD FRS Section 3: Sub Section 3.2.2: Service Provider ID (SPID) Migration Update	NA	Yes
3.2.2.1	TRD FRS Section 3: Sub Section 3.2.2.1: SPID Migration Updates and Processing	NA	Yes
3.2.2.2	TRD FRS Section 3: Sub Section 3.2.2.2 Requirements	NA	Yes
3.2.2.3	TRD FRS Section 3: Sub Section 3.2.2.3: SPID Migration Interface Messages	NA	Yes
3.2.2.4	TRD FRS Section 3: Sub Section 3.2.2.4: SPID Migration Reports	NA	Yes
3.3	TRD FRS Section 3: Sub Section 3.3: System Functionality	NA	Yes
3.4	TRD FRS Section 3: Sub Section 3.4: Additional Requirements	NA	Yes
3.4.1	TRD FRS Section 3: Sub Section 3.4.1: Valid NPA-NXXs in a Region Data Validations	NA	Yes
3.4.2	TRD FRS Section 3: Sub Section 3.4.2: NPA-NXX Modification	NA	Yes

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TRD Ref	Abbreviated Requirements/Instructions	Neustar Response Section	Neustar Will Meet/ Exceed Requirements
3.4.3	TRD FRS Section 3: Sub Section 3.4.3: Valid NPA-NXXs for each Service Provider	NA	Yes
3.4.4	TRD FRS Section 3: Sub Section 3.4.4: Pseudo-LRN in a Region Data Validations	NA	Yes
3.5	TRD FRS Section 3: Sub Section 3.5: NPA Splits Requirements	NA	Yes
3.5.1	TRD FRS Section 3: Sub Section 3.5.1: NPA-NXX-X, NPA Splits	NA	Yes
3.5.2	TRD FRS Section 3: Sub Section 3.5.2: Block Holder, NPA Splits	NA	Yes
3.6	TRD FRS Section 3: Sub Section 3.6: NPA-NXX Filter Management Requirements	NA	Yes
3.6.1	TRD FRS Section 3: Sub Section 3.6.1: NPA-NXX Level Filters	NA	Yes
3.6.2	TRD FRS Section 3: Sub Section 3.6.2: NPA Level Filters	NA	Yes
3.7	TRD FRS Section 3: Sub Section 3.7: Business Hour and Days Requirements	NA	Yes
3.8	TRD FRS Section 3: Sub Section 3.8: Notifications	NA	Yes
3.8.1	TRD FRS Section 3: Sub Section 3.8.1: TN Range, Notification Indicator	NA	Yes
3.8.2	TRD FRS Section 3: Sub Section 3.8.2: Customer No New Concurrence: Notification Indicator	NA	Yes
3.8.3	TRD FRS Section 3: Sub Section 3.8.3: SOA Notification Priority	NA	Yes
3.8.4	TRD FRS Section 3: Sub Section 3.8.4: TN and Number Pool Block In Notifications	NA	Yes
3.9	TRD FRS Section 3: Sub Section 3.9: Service Provider Support Indicators	NA	Yes
3.9.1	TRD FRS Section 3: Sub Section 3.9.1: SV Type and Alternative SPID Indicators	NA	Yes
3.9.2	TRD FRS Section 3: Sub Section 3.9.2: Alternative-End User Location and Alternative Billing ID Indicators	NA	Yes
3.9.3	TRD FRS Section 3: Sub Section 3.9.3: URI Indicators	NA	Yes
3.9.4	TRD FRS Section 3: Sub Section 3.9.4: Medium Timers Support Indicators	NA	Yes
3.9.5	TRD FRS Section 3: Sub Section 3.9.5: Pseudo-LRN Support Indicators	NA	Yes
3.10	TRD FRS Section 3: Sub Section 3.10: Multiple Service Provider IDs per SOA Association Requirements	NA	Yes

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TRD Ref	Abbreviated Requirements/Instructions	Neustar Response Section	Neustar Will Meet/ Exceed Requirements
3.11	TRD FRS Section 3: Sub Section 3.11: Bulk Data Download Functionality	NA	Yes
3.11.1	TRD FRS Section 3: Sub Section 3.11.1: Bulk Data Download Functionality - General	NA	Yes
3.11.2	TRD FRS Section 3: Sub Section 3.11.2: Network Data, Bulk Data Download	NA	Yes
3.11.3	TRD FRS Section 3: Sub Section 3.11.3: Subscription Version, Bulk Data Download	NA	Yes
3.11.4	TRD FRS Section 3: Sub Section 3.11.4: NPA-NXX-X Holder, Bulk Data Download	NA	Yes
3.11.5	TRD FRS Section 3: Sub Section 3.11.5: Block Holder, Bulk Data Downloads	NA	Yes
3.11.6	TRD FRS Section 3: Sub Section 3.11.6: Notifications, Bulk Data Download	NA	Yes
3.11.7	TRD FRS Section 3: Sub Section 3.11.7: Bulk Data Download Response Files	NA	Yes
3.12	TRD FRS Section 3: Sub Section 3.12: NPA-NXX-X Information	NA	Yes
3.12.1	TRD FRS Section 3: Sub Section 3.12.1: NPA-NXX-X Download Indicator Management	NA	Yes
3.12.2	TRD FRS Section 3: Sub Section 3.12.2: NPA-NXX-X Holder Information	NA	Yes
3.12.3	TRD FRS Section 3: Sub Section 3.12.3: NPA-NXX-X Holder, NPAC Scheduling/Re-Scheduling of Block Creation	NA	Yes
3.12.4	TRD FRS Section 3: Sub Section 3.12.4: NPA-NXX-X Holder, Addition	NA	Yes
3.12.5	TRD FRS Section 3: Sub Section 3.12.5: NPA-NXX-X Holder, Modification	NA	Yes
3.12.6	TRD FRS Section 3: Sub Section 3.12.6: NPA-NXX-X Holder, Deletion	NA	Yes
3.12.7	TRD FRS Section 3: Sub Section 3.12.7: NPA-NXX-X Holder, First Port Notification	NA	Yes
3.12.8	TRD FRS Section 3: Sub Section 3.12.8: NPA-NXX-X Holder, Query	NA	Yes
3.13	TRD FRS Section 3: Sub Section 3.13: Block Information	NA	Yes
3.13.1	TRD FRS Section 3: Sub Section 3.13.1: Version Status	NA	Yes
3.13.2	TRD FRS Section 3: Sub Section 3.13.2: Block Holder, General	NA	Yes
3.13.3	TRD FRS Section 3: Sub Section 3.13.3: Block Holder, Addition	NA	Yes

TRD Ref	Abbreviated Requirements/Instructions	Neustar Response Section	Neustar Will Meet/ Exceed Requirements
3.13.4	TRD FRS Section 3: Sub Section 3.13.4: Block Holder, Modification	NA	Yes
3.13.5	TRD FRS Section 3: Sub Section 3.13.5: Block Holder, Deletion	NA	Yes
3.13.6	TRD FRS Section 3: Sub Section 3.13.6: Block Holder, Query	NA	Yes
3.13.7	TRD FRS Section 3: Sub Section 3.13.7: Block Holder, Default Routing Restoration	NA	Yes
3.13.8	TRD FRS Section 3: Sub Section 3.13.8: Block Holder, Re-Send	NA	Yes
3.14	TRD FRS Section 3: Sub Section 3.14: Linked Action Replies	NA	Yes
3.15	TRD FRS Section 3: Sub Section 3.15: GTT Validation Processing by the NPAC/SMS	NA	Yes
3.15.1	TRD FRS Section 3: Sub Section 3.15.1: Sub System Number (SSN) Edit Flag Indicator	NA	Yes
3.15.2	TRD FRS Section 3: Sub Section 3.15.2: Global GTT Validations	NA	Yes
3.16	TRD FRS Section 3: Sub Section 3.16: Low-Tech Interface DPC-SSN Validation Processing NPAC/SMS	NA	Yes
4.0	SERVICE PROVIDER DATA ADMINISTRATION—Header Only	NA	NA
4.1	TRD FRS Section 4: Sub Section 4.1: Service Provider Data Administration and Management	NA	Yes
4.1.1	TRD FRS Section 4: Sub Section 4.1.1: User Functionality	NA	Yes
4.1.2	TRD FRS Section 4: Sub Section 4.1.2: System Functionality	NA	Yes
4.1.2.1	TRD FRS Section 4: Sub Section 4.1.2.1: Service Provider Data Creation	NA	Yes
4.1.2.2	TRD FRS Section 4: Sub Section 4.1.2.2: Service Provider Data Modification	NA	Yes
4.1.2.3	TRD FRS Section 4: Sub Section 4.1.2.3: Delete Service Provider Data	NA	Yes
4.1.3	TRD FRS Section 4: Sub Section 4.1.3: Service Provider Queries	NA	Yes
4.1.3.1	TRD FRS Section 4: Sub Section 4.1.3.1: User Functionality	NA	Yes
4.1.3.2	TRD FRS Section 4: Sub Section 4.1.3.2: System Functionality	NA	Yes
4.1.4	TRD FRS Section 4: Sub Section 4.1.4: Service Provider Accepted SPID List	NA	Yes

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TRD Ref	Abbreviated Requirements/Instructions	Neustar Response Section	Neustar Will Meet/ Exceed Requirements
4.2	TRD FRS Section 4: Sub Section 4.2: Additional Requirements	NA	Yes
5.0	SUBSCRIPTION MANAGEMENT—Header Only	NA	NA
5.1	TRD FRS Section 5: Sub Section 5.1: Subscription Version Management	NA	Yes
5.1.1	TRD FRS Section 5: Sub Section 5.1.1: Subscription Version Management	NA	Yes
5.1.1.1	TRD FRS Section 5: Sub Section 5.1.1.1: Version Status	NA	Yes
5.1.2	Subscription Administration Requirements	NA	Yes
5.1.2.1	TRD FRS Section 5: Sub Section: 5.1.2.1: User Functionality	NA	Yes
5.1.2.2	TRD FRS Section 5: Sub Section 5.1.2.2: System Functionality	NA	Yes
5.1.2.2.1	TRD FRS Section 5: Sub Section 5.1.2.2.1: Subscription Version Creation	NA	Yes
5.1.2.2.1.1	TRD FRS Section 5: Sub Section 5.1.2.2.1.1: Subscription Version Creation - Inter-Service Provider Ports	NA	Yes
5.1.2.2.1.2	TRD FRS Section 5: Sub Section 5.1.2.2.1.2: Subscription Version Creation - Intra-Service Provider Ports	NA	Yes
5.1.2.2.2	TRD FRS Section 5: Sub Section 5.1.2.2.2: Subscription Version Modification	NA	Yes
5.1.2.2.2.1	TRD FRS Section 5: Sub Section 5.1.2.2.2.1: Modification of a Pending or Conflict Subscription Version	NA	Yes
5.1.2.2.2.2	TRD FRS Section 5: Sub Section 5.1.2.2.2.2: Modification of an Active/Disconnect Pending Subscription Version	NA	Yes
5.1.2.2.3	TRD FRS Section 5: Sub Section 5.1.2.2.3: Subscription Version Conflict	NA	Yes
5.1.2.2.3.1	TRD FRS Section 5: Sub Section 5.1.2.2.3.1: Placing Subscription Version in Conflict	NA	Yes
5.1.2.2.3.2	TRD FRS Section 5: Sub Section 5.1.2.2.3.2: Removing a Subscription Version from Conflict	NA	Yes
5.1.2.2.4	TRD FRS Section 5: Sub Section 5.1.2.2.4: Subscription Version Activation	NA	Yes
5.1.2.2.5	TRD FRS Section 5: Sub Section 5.1.2.2.5: Subscription Version Disconnect	NA	Yes
5.1.2.2.6	TRD FRS Section 5: Sub Section 5.1.2.2.6: Subscription Version Cancellation	NA	Yes
5.1.2.2.6.1	TRD FRS Section 5: Sub Section 5.1.2.2.6.1: Un-Do a "Cancel Pending" Subscription	NA	Yes

TRD Ref	Abbreviated Requirements/Instructions	Neustar Response Section	Neustar Will Meet/ Exceed Requirements
5.1.2.2.7	TRD FRS Section 5: Sub Section 5.1.2.2.7: Subscription Version Resend	NA	Yes
5.1.3	TRD FRS Section 5: Sub Section 5.1.3: Subscription Queries	NA	Yes
5.1.3.1	TRD FRS Section 5: Sub Section 5.1.3.1: User Functionality	NA	Yes
5.1.3.2	TRD FRS Section 5: Sub Section 5.1.3.2: System Functionality	NA	Yes
5.1.4	TRD FRS Section 5: Sub Section 5.1.4: Subscription Version Processing for National Number Pooling	NA	Yes
5.1.4.1	TRD FRS Section 5: Sub Section 5.1.4.1: Subscription Version, General	NA	Yes
5.1.4.2	TRD FRS Section 5: Sub Section 5.1.4.2: Subscription Version, Addition for Number Pooling	NA	Yes
5.1.4.3	TRD FRS Section 5: Sub Section 5.1.4.3: Subscription Version, Block Create Validation of Subscription Versions	NA	Yes
5.1.4.4	TRD FRS Section 5: Sub Section 5.1.4.4: Subscription Version, Modification for Number Pooling	NA	Yes
5.1.4.5	TRD FRS Section 5: Sub Section 5.1.4.5: Subscription Version, Deletion for Number Pooling	NA	Yes
5.1.4.6	TRD FRS Section 5: Sub Section 5.1.4.6: Subscription Version, Block Delete Validation Subscription Versions	NA	Yes
6.0	NPAC/SMS INTERFACES—Heading Only	NA	Yes
6.1	TRD FRS Section 6: Sub Section 6.1: SOA to NPAC/SMS Interface	NA	Yes
6.2	TRD FRS Section 6: Sub Section 6.2: NPAC/SMS to LSMS Interface	NA	Yes
6.3	TRD FRS Section 6: Sub Section 6.3: Interface Transactions	NA	Yes
6.4	TRD FRS Section 6: Sub Section 6.4: Interface and Protocol Requirements	NA	Yes
6.4.1	TRD FRS Section 6: Sub Section 6.4.1: Protocol Requirements	NA	Yes
6.4.2	TRD FRS Section 6: Sub Section 6.4.2: Interface Performance Requirements	NA	Yes
6.4.3	TRD FRS Section 6: Sub Section 6.4.3: Interface Specification Requirements	NA	Yes
6.4.4	TRD FRS Section 6: Sub Section 6.4.4: Request Restraints Requirements	NA	Yes

TRD Ref	Abbreviated Requirements/Instructions	Neustar Response Section	Neustar Will Meet/ Exceed Requirements
6.4.5	TRD FRS Section 6: Sub Section 6.4.5: Application Level Errors Requirements	NA	Yes
6.5	TRD FRS Section 6: Sub Section 6.5: NPAC SOA Low-tech Interface Requirements	NA	Yes
6.6	TRD FRS Section 6: Sub Section 6.6: CMIP Request Retry Requirements	NA	Yes
6.7	TRD FRS Section 6: Sub Section 6.7: Recovery Requirements	NA	Yes
6.8	TRD FRS Section 6: Sub Section 6.8: Out-Bound Flow Control Requirements	NA	Yes
6.9	TRD FRS Section 6: Sub Section 6.9: Roll-Up Activity and Abort Behavior Requirements	NA	Yes
6.10	TRD FRS Section 6: Sub Section 6.10: NPAC Monitoring of SOA and LSMS Associations Requirements	NA	Yes
6.11	TRD FRS Section 6: Sub Section 6.11: Separate SOA Channel for Notifications Requirements	NA	Yes
6.12	TRD FRS Section 6: Sub Section 6.12: Maintenance Window Timer Behavior Requirements	NA	Yes
7.0	SECURITY—Header Only	NA	Yes
7.1	TRD FRS Section 7: Sub Section 7.1: Security Overview	NA	Yes
7.2	TRD FRS Section 7: Sub Section 7.2: Identification Requirements	NA	Yes
7.3	TRD FRS Section 7: Sub Section 7.3: Authentication	NA	Yes
7.3.1	TRD FRS Section 7: Sub Section 7.3.1: Password Requirements	NA	Yes
7.4	TRD FRS Section 7: Sub Section 7.4: Access Control	NA	Yes
7.4.1	TRD FRS Section 7: Sub Section 7.4.1: System Access Requirements	NA	Yes
7.4.2	TRD FRS Section 7: Sub Section 7.4.2: Resource Access	NA	Yes
7.5	TRD FRS Section 7: Sub Section 7.5: Data and System Integrity	NA	Yes
7.6	Sub Section 7.6: Audit	NA	Yes
7.6.1	TRD FRS Section 7: Sub Section 7.6.1: Audit Log Generation Requirements	NA	Yes
7.6.2	TRD FRS Section 7: Sub Section 7.6.2: Reporting and Intrusion Detection Requirements	NA	Yes

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TRD Ref	Abbreviated Requirements/Instructions	Neustar Response Section	Neustar Will Meet/ Exceed Requirements
7.7	TRD FRS Section 7: Sub Section 7.7: Continuity of Service	NA	Yes
7.8	TRD FRS Section 7: Sub Section 7.8: Software Vendor	NA	Yes
7.9	OSI Security Environment	NA	Yes
7.9.1	TRD FRS Section 7: Sub Section 7.9.1: Threats	NA	Yes
7.9.2	TRD FRS Section 7: Sub Section 7.9.2: Security Services	NA	Yes
7.9.3	Security Mechanisms	NA	Yes
7.9.3.1	TRD FRS Section 7: Sub Section 7.9.3.1: Encryption	NA	Yes
7.9.3.2	TRD FRS Section 7: Sub Section 7.9.3.2: Authentication	NA	Yes
7.9.3.3	TRD FRS Section 7: Sub Section 7.9.3.3: Integrity and Non-Repudiation	NA	Yes
7.9.3.4	TRD FRS Section 7: Sub Section 7.9.3.4: Access Control	NA	Yes
7.9.3.5	TRD FRS Section 7: Sub Section 7.9.3.5: Audit Trail	NA	Yes
7.9.3.6	TRD FRS Section 7: Sub Section 7.9.3.6: Key Exchange	NA	Yes
8.0	AUDIT ADMINISTRATION—Information Only	NA	Yes
8.1	TRD FRS Section 8: Sub Section 8.1: Overview	NA	Yes
8.2	TRD FRS Section 8: Sub Section 8.2: Service Provider User Functionality	NA	Yes
8.3	TRD FRS Section 8: Sub Section 8.3: NPAC User Functionality Requirements	NA	Yes
8.4	TRD FRS Section 8: Sub Section 8.4: System Functionality Requirements	NA	Yes
8.5	TRD FRS Section 8: Sub Section 8.5: Audit Report Management Requirements	NA	Yes
8.6	TRD FRS Section 8: Sub Section 8.6: Additional Requirements	NA	Yes
8.7	TRD FRS Section 8: Sub Section 8.7: Database Integrity Sampling	NA	Yes
8.8	TRD FRS Section 8: Sub Section 8.8: Audit Processing in a Number Pool Environment Requirements	NA	Yes

TRD Ref	Abbreviated Requirements/Instructions	Neustar Response Section	Neustar Will Meet/ Exceed Requirements
8.9	TRD FRS Section 8: Sub Section 8.9: Audit Processing in a Pseudo-LRN Environment Requirements	NA	
9.0	REPORTS—Information Only	NA	Yes
9.1	RD FRS Section 9: Sub Section 9.1: Overview	NA	Yes
9.2	TRD FRS Section 9: Sub Section 9.2: National Number Pooling Reports Requirements	NA	Yes
9.3	TRD FRS Section 9: Sub Section 9.3: System Functionality Requirements	NA	Yes
9.3.1	TRD FRS Section 9: Sub Section 9.3.1: National Number Pooling Reports Requirements	NA	Yes
9.3.2	TRD FRS Section 9.3: Sub Section 9.3.2: Cause Code Reports Requirements	NA	Yes
9.3.3	TRD FRS Section 9: Sub Section 9.3.3: Resend Excluded Service Provider Report Requirements	NA	Yes
10.0	PERFORMANCE AND RELIABILITY	NA	Yes
10.1	TRD FRS Section 10: Sub Section 10.1: Availability and Reliability	NA	Yes
10.2	TRD FRS Section 10: Sub Section 10.2: Capacity and Performance	NA	Yes
10.3	TRD FRS Section 10: Sub Section 10.3: Requirements Not Given a Unique ID	NA	Yes
11.0	BILLING	NA	Yes
11.1	TRD FRS Section 11: Sub Section 11.1: User Functionality	NA	Yes
11.2	TRD FRS Section 11: Sub Section 11.2: System Functionality	NA	Yes
12.0	TRD Detailed Response	NA	NA
12.1	Please attach a SUMMARY document explaining how the Respondent's proposal addresses the requirements defined in this TRD survey, and explain in detail any differences and suggested areas of improvement (as an example, reduction of BDD processing time), or enhancements which may affect the NPAC/SMS implementation, ensuring the Respondent's proposal will not interfere with or degrade any porting/pooling activities. This summary document should also be used to include an explanation of any "No" responses	Iasta Tool, Proposal Section 1.2 in its entirety	

EXECUTIVE SUMMARY

Why Neustar

- Neustar's exceptional service as the U.S. LNPA delivers billions of dollars in value to U.S. Service Providers, and enables telecom choice and competition for consumers and businesses
- Our technology and management team have exceeded every expectation of performance, from a 99.94% service level achievement over the last five years to a 3.84 out of 4 industry satisfaction rating in 2012
- Our proposal for LNPA service 2015-2022 includes invaluable innovations to support the communications industry's strategic priorities, including the transition to IP networks and machine-to-machine applications
- Neustar's renewal for nationwide service eliminates the risk of an unprecedented industry-wide transition, estimated to cost over $700 million in the first year alone
- Neustar offers significantly improved financial terms for the next contract, including nearly [redacted] million in first year savings, bundled enhancements, and further incentives to drive innovation

Neustar's proposal to extend its current contract as the U.S. Local Number Portability Administrator (LNPA) is distinguished by our unrivaled expertise and our 15-year commitment to performance, neutrality, and innovation. Our proposal reduces Industry costs, exceeds the increased requirements in the North American Portability Management (NAPM) LLC's Request For Proposal, and above all provides significant incremental value to Service Providers facing a decade of unprecedented change. Neustar's exceptional capabilities as the current operator of the Number Portability Administration Center Service Management System (NPAC/SMS) provide the communications industry (Industry) and its consumers something no other vendor can credibly claim: increased performance with zero risk.

Over the course of Neustar's current term as the LNPA, the NPAC/SMS has been established as foundational infrastructure for U.S. Service Providers—ensuring the accurate completion of trillions of voice calls and text messages, and providing essential support for countless technology migrations, product launches, mergers and acquisitions, and recoveries from natural and man-made disasters. In the time it takes to read this sentence, Neustar will receive and validate a number portability request from a Service Provider, update the routing platforms of connected networks across the U.S., and verify to the requestor that its transaction was fulfilled. Between now and the scheduled selection of the LNPA vendor for the next term, millions of wireless consumers will change Service Providers and retain their phone numbers, making possible the competition for billions of dollars in telecommunications revenue.

For the new contract term, Neustar is offering not only to sustain and enhance the reliable, scalable, secure, and neutrally administered service on which the Industry depends, but also to deliver an aggressive series of investments and innovations designed to address our customers' most critical strategic priorities. The NPAC/SMS has played a vital role in the positive impact technology innovation has had on the U.S. economy since the 1996 Telecommunications Act. Its future impact is likely to be even more profound, as the Industry embraces the challenges of IP network transformation, an explosion in connected devices, and a growing variety of diverse business models. By extending its successful partnership with Neustar today, the Industry can align its resources and focus its energies on tomorrow's objectives, with complete confidence in our continued partnership and performance.

Value to Service Providers, Regulators, and Consumers

Although we rarely make headlines—or perhaps because we rarely make headlines—Neustar has long been a reliable partner for Service Providers in their endeavors to acquire and retain customers, roll out new products, evolve their networks, and comply with regulatory policy. The performance and security of the NPAC/SMS is essential to the accurate routing and rating of billions of calls and texts each day, and is unique worldwide in the exceptional value it offers the Industry and consumers:

- **Competitive Porting**—Over 30% of total churn in the U.S. involves number portability and thus relies upon the NPAC/SMS registry[1]—impacting tens of millions of consumers and over $40 billion in total subscriber contract value every year. Nearly half of all consumers report that if they could not take their telephone number with them, no amount of discounts could induce them to change Service Providers—making a high-performing NPAC/SMS absolutely essential to market competition and subscriber acquisition. U.S. consumers benefit from the fastest wireless porting experience in the world, and ours is one of the only platforms among 70 LNP-supporting countries to deliver fixed line, mobile, VoIP, and intermodal porting in a single central registry.

- **National Thousand-Block Pooling**—In 2002, National Pooling was introduced as an essential means to accommodate an exponential demand for telephone numbers, arising from wireless growth and telecom competition. National Pooling has increased the lifespan of the North American Numbering Plan by decades, preserving over 55,000 local exchange codes for future use by consumers. This is equivalent to 71 area codes, or over 500 million individual telephone numbers[2] saved. Pooling is relied upon by hundreds of competitive Service Providers across the country, for whom it is the only means of acquiring new telephone numbers to support consumer demand. National Pooling is unique to the U.S. market, and today represents approximately 24% of all U.S. telephone number inventory. Neustar successfully executes over 40,000 pooled block activations and updates each year with success rates that exceed 99.9%.

[1] Calculated by comparing NPAC/SMS wireless inter-service provider activates with total voluntary churn figures reported by CTIA
[2] As reported by the North American Numbering Plan Administrator and Pooling Administrator

- **Network Management**—The NPAC/SMS also permits Service Providers to make real-time updates to their own networks, moving subscribers and devices between facilities or underlying technologies, to enable new services or reduce costs. Over 96 million telephone numbers have been added to the NPAC/SMS by their assigned Service Providers as a result of customer product upgrades, technology migrations, load balancing, and mergers & acquisitions. The ongoing move to all-IP infrastructure, which has driven billions of dollars of investment on the part of Service Providers, has already begun to leverage the NPAC/SMS's network-agnostic design to facilitate broad adoption and offer material cost savings to the Industry.

- **Disaster Recovery**—The NPAC/SMS provides an essential layer of redundancy and resiliency in Service Provider networks, thanks to its ability to reroute terminating call traffic away from damaged or destroyed facilities, in real-time and with minimal coordination. In the wakes of Hurricane Katrina and the September 11th attacks, Neustar worked with Service Providers, state regulators, and the FCC to restore the service of hundreds of thousands of consumers and businesses. Today, Service Providers rely upon the NPAC/SMS to maintain proactive disaster recovery plans for critical network infrastructure, ready to execute at a moment's notice.

- **Law Enforcement/Public Safety**—The LNPA is the only authoritative data source available to U.S. law enforcement and public safety agencies regarding telephone number assignment—including those related to pre-paid users and VoIP Service Providers. When an investigator needs to know where to direct a subpoena for telecom billing records, or an ambulance dispatcher needs to quickly correlate a telephone number data to a telecom billing address, they often begin with Neustar's services.

As we describe in our proposal, consumers and Service Providers rely on the LNPA to sustain market competition, preserve and assign numbering resources, and manage critical infrastructure. It is embedded in the day-to-day business operations for thousands of Industry constituents, and has become an institutional part of the way communications service is delivered in the United States.

NPAC/SMS Facts and Figures

Lines of Code	[redacted]
Service Provider Accounts	4,800+
Mechanized Provisioning Endpoints (SOA)	604
Mechanized Distribution Endpoints (LSMS)	243
Telephone Numbers Under Management	620 million+
Populated Routing, Rating, and Billing Data Elements	5 billion +
Daily Adds, Modifies, Disconnects	1.3 million +
Annual Interactions with Service Provider networks	12 billion +
Time to update all U.S. networks and confirm accurate completion	7 seconds

Complex Infrastructure and Essential Services

The NPAC/SMS is the largest, fastest, and most complex number portability system in the world, processing over 14 times as many transactions, orders of magnitude faster than the next largest international platform[3]. The NPAC/SMS receives over 1.3 million real-time adds, modifies, and disconnections each and every day from Service Provider network operations and order management systems. Those requests then traverse a highly scalable and secure 5-layer system architecture, designed to deliver authoritative information to the country's many interconnected networks within seven seconds of the initial receipt. Information distributed by the NPAC/SMS is then relied upon to support the accurate routing and rating of voice calls and text messages for hundreds of millions of consumers, along with a variety of downstream operations such as revenue assurance and legal compliance. The complexity and scalability of the NPAC/SMS is a reflection of the technical and business diversity of the U.S. market, and the high expectations of U.S. consumers.

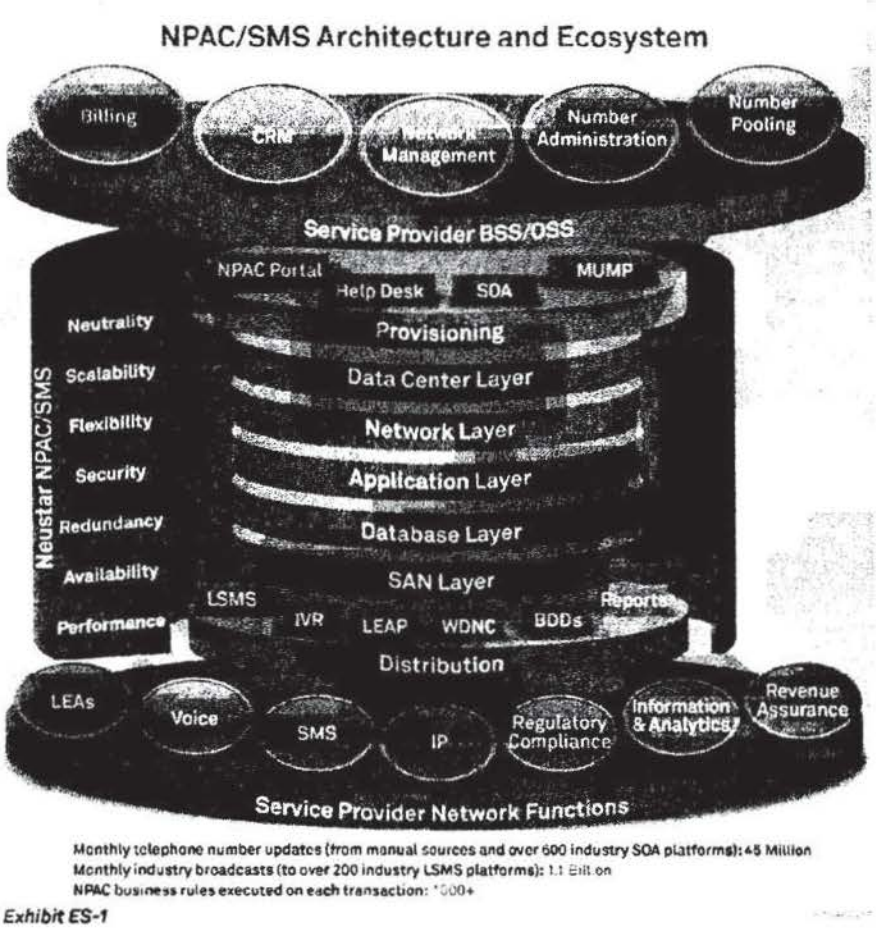

Exhibit ES-1

3 India reports 32.7 million porting transactions between February '11 and January '12. During that same period, the NPAC/SMS processed over 468 million. In the U.S. consumers can change service providers within minutes; in India it can take up to seven days

In addition to operating the NPAC/SMS registry, the LNP Administrator is relied upon each and every day to be a direct extension of Service Provider operations, a neutral focal point for Industry collaboration and cooperation, and a consultative source for regulators and policy officials. Neustar's team possesses a unique combination of knowledge and expertise, earned through years of day-to-day production experience with mission-critical activities, which no other vendor has or could hope to acquire in a reasonable timeframe. For example:

Neustar's LNP Administration

Exhibit ES-2

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- Neustar **directly executes Service Providers' major porting projects**, including over 55,000 customer and network management projects in 2012, ensuring service continuity and accurate data for millions of subscribers

- Neustar routinely **organizes and leads innovation** and change management initiatives, facilitating Industry collaboration and consensus-building among a diverse set of Service Provider, technology vendor, and regulator constituents, leading to the development of Industry-wide standards and specifications for interoperability and compliance. This partnership in innovation has led to the evaluation, implementation and deployment of more than 380 nationwide Change Orders in the NPAC/SMS since 1997, delivered without disruption to thousands of NPAC Users throughout the U.S.

- We have developed and routinely executed the procedures for **simultaneous reassignments of numbering resources**, such as Service Provider Identifier (SPID) migrations and area code splits, which preserve numbering resources, enable network consolidations, and require the coordination and participation of hundreds of Service Providers and their partners.

- **Neustar is a key enforcer of Industry policy** regarding access to confidential and proprietary Service **Provider information**, offering support to Service Provider partners and non-telecom third parties **while** ensuring **only** proper use **of NPAC/SMS** data. To offer one example, Neustar currently serves **over** 1,600 telemarketers and credit/collections agencies in their requirements to comply with the **Telephone** Consumer Protection Act (TCPA), which forbids the use of auto-dialers when calling **wireless** phones.

A Record of Exceptional Performance

The communications industry evaluates Neustar against 2,268 individual service level measurements, a wide variety of external audits and regular certifications, and an annual NPAC User survey that polls all U.S. Service Providers on Neustar's accessibility and responsiveness. Across every single measure available, Neustar offers the highest levels of performance to Service Providers and consumers:

- 11,333 successfully met or exceeded service level measurements over the last five years—a 99.94% success rate against Industry requirements.
- A 3.84 out of 4 score across all categories of our annual NPAC User survey in 2012, which measures each aspect of the LNPA Service for neutrality, responsiveness, accessibility, and the urgency with which we address customer needs.
- Over 80% of first call resolution rate by tier 1 help desk, delivering rapid resolution without escalations and handoffs.
- Greater than 99.9% accuracy record for the millions of manual network changes executed on behalf of Service Providers each year.
- Zero material deficiencies, weaknesses, or non-conformities for the last five years on all Industry standard and NAPM-requested audits.
- Security-Related Information
- Zero complaints to the FCC reported to Neustar from Service Providers or consumers regarding the LNPA's service, billing, or neutrality.

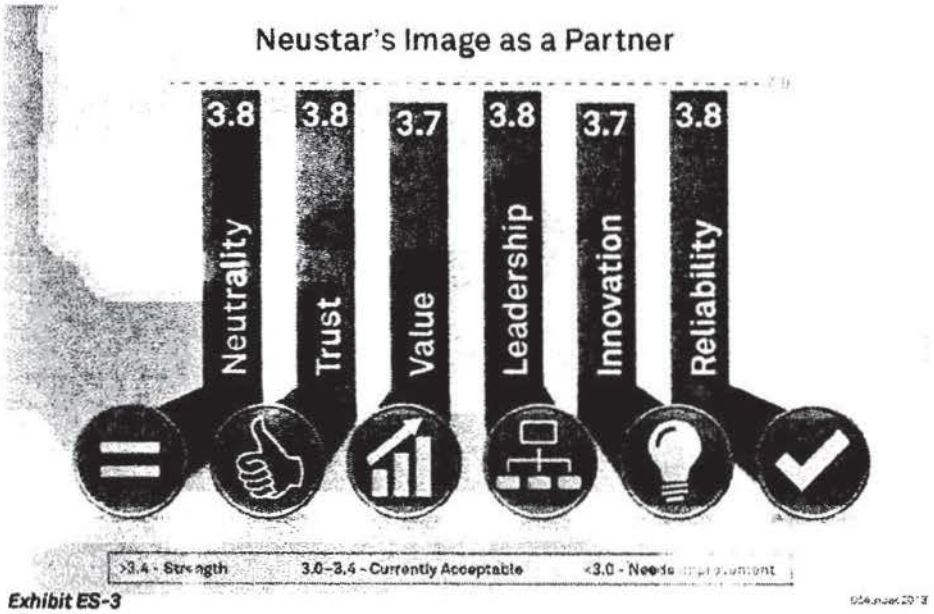

Exhibit ES-3

Neustar has established a tailored approach to LNPA service delivery that guarantees Service Providers and their consumers the very highest levels of stability and performance. Tasks like Industry change management, software development and deployment, customer certification, performance monitoring, root cause analysis, and security evaluation, are all custom-fit to the multifaceted and collaborative nature of LNP Administration, and are performed by dedicated experts with unique Industry experience. Because of the high level of Industry expertise required to provide the LNPA Service, **no part of our operation is outsourced to third parties and subcontractors, which offers** Service Providers maximum accountability on Neustar's part.

Neustar provides the Industry with peace of mind that stems from a level of trust and credibility second to none. We subject every aspect of the LNPA service to strict scrutiny and oversight, with a tailored combination of robust internal controls, frequent external audits and evaluations, and full transparency with the Industry and the FCC. As a global leader in Internet security evaluation and risk-mitigation, Neustar takes a proactive and predictive approach to assessing any potential weaknesses and threats to the systems and infrastructure, conducting regular audits, penetration tests, and performance evaluations under production conditions.

In the new contract term, the NAPM, LLC has mandated adherence to increased Service Level Requirements, which exceed the Industry's current, already-high standards for performance. Neustar enthusiastically endorses the new requirements and has proposed additional audits and certifications in reflection of Service Provider needs for the next decade. The Industry and the FCC can select Neustar in the confidence that our technical performance will remain unsurpassable, and will provide a solid foundation for the Industry's future needs.

A Unique Role; a Unique Company to Fulfill It

Neustar was founded on, and designed in perfect alignment with, the values and characteristics necessary to administer Local Number Portability—neutrality, security, privacy, and performance. Our unique corporate capabilities and credentials all contribute to continued performance and innovation in the NPAC/SMS:

- Neustar is at the forefront of technology and market evolution, and delivers world-class services for customers across several Industry sectors. Neustar's experts currently lead or contribute to over 40 distinct organizations, consortia, and Industry forums focused on communications and the Internet, including Internet Engineering Task Force (IETF), the Global Systems for Mobile Communications Association (GSMA), and the FCC's Technical Advisory Council (TAC).

What are customers saying about Neustar?

The following is a selection of feedback from several of our most recent customer satisfaction surveys. The surveys assess Neustar's performance in the eyes of NPAC users across the communications market – from industry leaders and new entrants alike.

"Neustar and the NPAC have set a very high bar to exceed in terms of reliability, performance, and customer focus."

"While the employees are Neustar's greatest asset, the fact that Neustar has incorporated 'neutrality' into the mission of the job itself, and holds the employees accountable for it, by far sets Neustar high above the bar."

"My ONLY wish is that the standards set by Neustar would be followed by other vendors in the industry."

"We were given the responsibility of porting with very little knowledge of how it works. Over the last 5-6 years Neustar has taught me everything there is to know about SOA & porting. They are always so willing to help."

"Neustar help desk and personnel are the best that I deal with in the industry for prompt, friendly and efficient service."

"Any issue I have had concerning the use of NPAC has been met with a "can do" attitude by Neustar employees. Swift action also seems to be the norm for your company."

"By far the best team I have worked with. Very professional and meets every need with a positive approach."

"Neustar always goes above and beyond the call of duty."

"I couldn't run my department without Neustar and the trust I have in their knowledge."

- Neustar is a global leader in Internet security evaluation and risk-mitigation, incorporating leading security technologies and Industry best practices into all services offered to our customers. Neustar has developed its own tailored security framework, called NeuCIRT/SOC (Cyber Incident Response Team/Security Operations Center). Within Neustar's state-of-the-art NeuCIRT/SOC facility, analysts use customized and commercially available tools such as **NeuSentry,** a security intelligence capability that provides early warning of security threats and issues, and real-time monitoring for cyber events. Neustar is a recognized market expert in consumer privacy and cyber security, bringing to bear a combination of policy expertise and technical acumen to provide the highest possible confidence to our customers and to regulators.

- In addition to our Local Number Portability Administration services, Neustar is **the world's leading authoritative DNS services provider,** hosting services in over 40 international locations and consistently delivering high availability and low latency to thousands of customers worldwide. Neustar also operates one of the world's largest denial-of-service mitigation product—**SiteProtect**—offering reliable protection to enterprises against political or economic cyber attack. Neustar has developed advanced virtualization techniques to power **WebMetrics,** a website performance and monitoring service that is deployed in over 110 locations around the world.

- Building upon our experience as an operator of neutral third party services for diverse constituents, Neustar is also the administrator for **UltraViolet™**, the digital rights media platform that provides over 10 million registered consumers the "buy once, play anywhere" convenience for all their digital entertainment content. The UltraViolet™ ecosystem includes device manufacturers, retailers, and film & TV studios across the entertainment Industry. Neustar also provides directory services for the 5-digit and 6-digit number strings used for all U.S. Common Short Codes **(CSC).**

Neustar has been the perfect partner for Service Providers and the FCC, and commits to building on that partnership in the next term. Neustar is a U.S.-based and operated, publicly traded company, subject to all relevant SEC, FASB, and Sarbanes Oxley reporting requirements; this will continue to offer maximum transparency and stability to Serivce Providers and the FCC. Neustar has an outstanding credit rating and a strong balance sheet to absorb and manage unforeseen risks—and we have no litigation, pending or historical, with our current NPAC customers or with the U.S. government. We are also committed to the education and development of the next generation of U.S. technology engineers; as a result we support a variety of programs dedicated to promoting STEM-related learning and opportunity, including My Digital Life, which focuses on digital literacy education, and the Anita Borg Institute, which promotes opportunities for women in technology.

The Trust of an Industry: Neustar's Neutrality

The LNPA is trusted to safeguard proprietary net-work data for millions of devices and consumers. It has the ability to impede or distort market competition through preferential treatment or biased operation. And it often holds the reins on the execution of critical network and policy evolutions, including IP interconnection and telephone number exhaust prevention. As a result, any degradation in neutrality—whether actual or perceived—can in an instant undermine confidence and erode the LNPA's value to consumers and the Industry

Neustar is the Industry and the FCC's most trusted resource for neutral administration services and consultation on telephone number-related issues. In addition to our role as the U.S. LNPA, we also currently serve the FCC and the Industry as the **North American Numbering Plan Administrator (NANPA), National Pooling Administrator (PA)**—both of which, like the NPAC/SMS, consistently receive the highest marks for quality, user satisfaction, and neutrality. The trust placed in Neustar to operate these services is built on a series of unique foundations:

- Neustar operations since 1999 have been guided by a unique and proven **Code of Conduct,** developed in collaboration with the FCC and the Industry. The Code governs the stewardship of confidential information, forbids special preference or consideration to individual Service Providers or, by extension, Industry segments, and establishes clear limitations on Neustar board ownership, investors, and employees. The Code of Conduct drives Neustar's culture and reinforces the values of neutrality throughout the company.

- Neustar mandates that its employees and directors affirm their adherence to the Code of Conduct—including limitations on telecom investment and board participation—in **quarterly certifications,** and be trained and tested on the values and practices of neutrality once a year. We have established a **Neutrality Audit Committee**, and a position of **Neutrality Officer,** who together have the responsibility of assessing and ensuring Neustar's ongoing compliance with all tenets of the neutrality program.

HIGHLY CONFIDENTIAL

- As a condition of the FCC and Industry's neutrality rules, Neustar engages in constant evaluation of its **investor base,** ensuring no entity with a 5% or greater share of the company is affiliated with a TSP.

- Neustar performs annual **Neutrality Audits** as the LNPA, and quarterly Audits as the NANPA and the PA, all of which include a certification submitted by Neustar's CEO on behalf of the company. The auditors verify all interactions between the LNPA, the Industry, and third party users such as Law Enforcement and telemarketing companies, to ensure that in every instance parties are treated with full impartiality. We are pleased to report that to date, Neustar has passed all ten LNPA Audits, and 50 quarterly NANPA/PA audits with zero deficiencies.

Neutrality remains an integral part of who we are—it even comprises part of our name. More than any other prospective vendor, Neustar has fully committed both to the letter and the spirit of the Industry and the FCC's requirements. We are not beholden to a parent company with other interests in number administration or network management, and we do not rely upon subcontractors whose neutrality could impact the work of the LNPA. By selecting Neustar for the next term, the Industry and the FCC ensure continued confidence that the LNPA's neutrality will remain paramount.

Added Value for the Next Generation LNPA

Neustar's proposal for the next term includes continued investments into virtually all aspects of the LNPA service, available on the first day of the new contract at no incremental cost. We will deliver a new NPAC User Portal to provide consolidated access to essential data and functionality, expanded service options including a 24x7x365 help desk, application automations to exceed system availability and throughput requirements, and additional testing, connectivity and security options for our customers. We have also committed to each of the RFP's requirements related to in-flight and near-future change orders, in keeping with Neustar's proven ability to introduce change without disruption. These enhancements will provide the Industry with the operational flexibility to accommodate growing transaction volumes, changes in underlying network technology, and ongoing policy adjustments—just as we have since we began serving as the LNPA in 1997.

In addition, Neustar is proposing a series of opportunities for future NPAC innovation4, each building on the NPAC/SMS's unique position within the telecommunications ecosystem, and designed to address the communications industry's strategic challenges and opportunities. By the time the next LNPA contract term begins in 2015, there will be another 174 million telephone-number addressable devices connected to telecom networks—handsets, smartphones, and machine-to-machine endpoints. By 2020, the Industry will have reached critical mass on the full transition to IP networks, with another 500 million traditional and machine-to-machine devices in service. At the present time, Neustar is actively engaged with Service Providers and the FCC in the definition and implementation of the next decade's number administration requirements. We look forward to continuing to deliver our unique insight to the Industry in the next term.

4 Neustar's proposals for NPAC/SMS evolution are designed to be evaluated by the LNPA Working Group and the NAPM, LLC at the appropriate time. Each of our proposed enhancements is included in our proposal, and is built on the NPAC/SMS's secure, reliable, and nationwide foundation.

Growth and Innovation in the NPAC

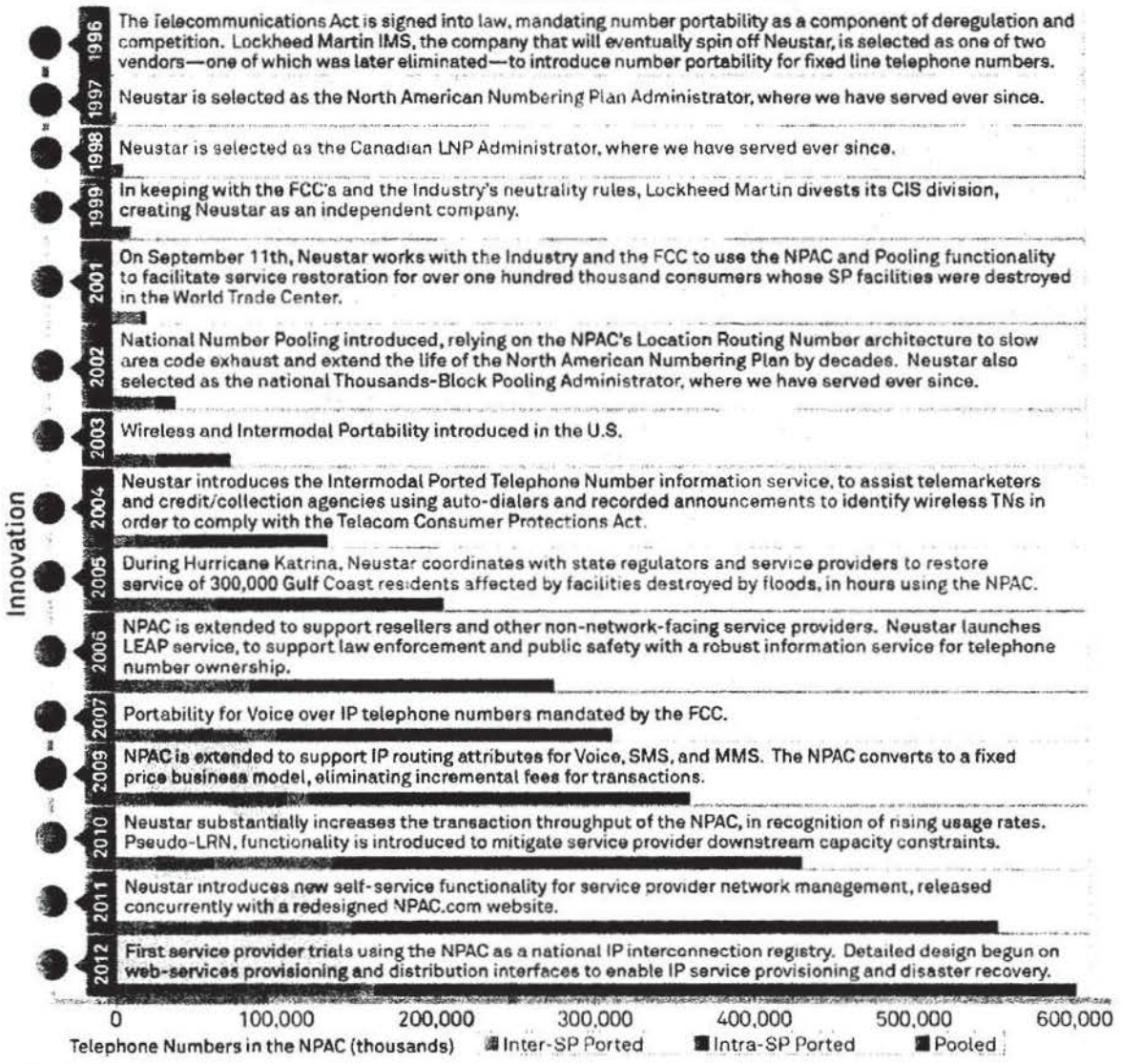

Exhibit ES-4

Neustar proposes working with Service Providers and regulators to provide the following additional LNPA services in the new contract term, at no additional charge:

- National IP Interconnection: In 2012 Neustar conducted the Industry's first proof-of-concept trials using the NPAC/SMS's Voice URI capability to perform national IP interconnection services, with the Industry's largest Service Providers and third party technology vendors.

- The NPAC/SMS will provide the tools necessary for the administration, assignment, and interoperability of non-geographic and machine-to-machine telephone numbers, which are expected to rise to over 500 million by 2020.

- The NPAC/SMS will support the dynamic provisioning and distribution of IP endpoints on next generation carrier networks, reacting in real time to subscriber behavior, and saving fixed-line and wireless Service Providers hundreds of millions of dollars in network build-out costs and optimal least-cost routing.

- Neustar will establish a certificate authority to enable secure, reliable authentication of telephone-number based network provisioning and distribution over the Internet—providing a critical layer of safety and security for next generation telecom service.

- We will support implementation of a common stolen equipment registry for smartphones and other handsets, to further support reliable information exchange and compliance with related regulatory requests.

- Neustar will provide access for all NPAC/SMS Users to our proprietary and award-winning information and analytics engine, ElementOne (E1). The E1 architecture provides a powerful and user-friendly mechanism to assemble and visualize a Service Provider's NPAC/SMS data, leading to better business decisions regarding network capacity and allocations, resource assignment, and subscriber retention and acquisition.

Neustar has described these innovations and more within our proposal, and included a series of white papers that provide additional detail. The proposed innovations remove the need to develop and deploy new standalone solutions, instead leveraging the NPAC/SMS's existing interfaces and saving significant costs. Additional benefits will include reduced fraud and abuse, optimized network planning and configuration, and additional revenue streams for the communications industry. Use of the NPAC/SMS's reliable and recognized technology and procedures will accelerate adoption of Industry-wide standards, further supported by Neustar's guarantees of neutrality and permitted use enforcement. Most importantly, extending Neustar's contract as the LNPA permits the Industry and the FCC to take advantage of these opportunities immediately, rather than expend energy and focus its capital resources on the monumental task of replicating Neustar's current performance with one or more new vendors.

All Reward and No Risk

Proven performance within a complex multifaceted environment. Unassailable neutrality and corporate credentials. Committed investments to support the Industry's most critical requirements. Neustar offers all this and more to an Industry undergoing significant market and technological change over the next decade. This proposal represents a choice for the Industry and the FCC—build on today's success to focus on future priorities, or try to replicate the present at enormous risk and expense.

Transitioning the NPAC/SMS registry in the United States to a new vendor would be an endeavor without precedent in scope or complexity, and would be fraught with consumer risk, notwithstanding the best of intentions and rigorous planning on the part of Service Providers and prospective vendors. There are no existing methods or procedures to execute an LNPA transition; it would require a level of Industry alignment that surpasses even the most complex LNP architecture planning (e.g. NPAC/SMS multi-vendor peering). Once the Industry groups and regulators have incurred the expense of developing and agreeing to a transition plan, hundreds of service providers would then be required to comply with a fixed and very aggressive schedule, with no current governance model to address delays or issues. Perhaps most importantly, the cost and risk of a transition will fall most heavily on the Service Providers who use the NPAC/SMS the most—i.e. new entrants and smaller Service Providers with the majority of their telephone number inventories already in the NPAC/SMS.

Any new vendor in this environment—by definition—would be learning on the job. A new LNPA vendor would have to mitigate against a near certainty of data corruption, errors or delays in essential network updates, a staff that lacks the expertise to perform critical Industry tasks, allegations or perceptions of non-neutrality, and non-uniform consumer experiences across the U.S. A leading economics research firm with a specialty in telecommunications, Navigant, Inc., has quantified the potential costs and risks to Service Providers of NPAC/SMS transition at over $719 million in the first year alone[5]. The analysis uses a conservative estimate of transition impacts, and builds on universally accepted methodologies and published materials describing the experience of other firms and industries. Potential impacts include:

- **Failed calls and texts—For every 0.1%** failure rate on an initial NPAC/SMS data migration, 622,000 telephone numbers are impacted, resulting in millions of failed calls and texts and raising customer care costs accordingly. Critical information is updated and redistributed in the NPAC/SMS over a million times per day, through mechanized interfaces and manually by trained expert LNPA staff. Even a small degree of error or delay introduced by a new vendor has ripple effects throughout the Industry.

- Delayed or lost subscriber revenue—A loss of system availability in the NPAC/SMS can prevent the porting of over 47,000 wireless consumers, representing the loss of up to $10 million in total subscriber contract value, per day. During periods of peak transaction activity—especially during Service Provider handset launches and major marketing campaigns—these figures can double.

5 See attached white paper by Hal Singer, Navigant, Inc. Neustar has also estimated that the costs of migrating to a regional NPAC model with multiple vendors will raise transition and operations cost on affected providers by up to 50%. Today, only 29% of telephone numbers housed in the NPAC are served by Providers operating in only one region – making any regional transition effectively national in scope. Most importantly, dividing the NPAC along legacy geographic boundaries runs directly counter to industry trends of consumer mobility and IP network interconnection.

- Blocked access to numbering resources—Each day the NPAC/SMS is out of service may impede the activation of over 100,000 telephone numbers from the National Pooling process, severely limiting competitive Service Providers' ability to activate customers and maintain healthy inventories.

- Inability to complete mergers & acquisitions, technology migrations, and customer launches—Service degradations at the LNPA will delay or impede ongoing Industry activity that relies upon universal, accurate, and prompt delivery of network changes

- Stalled innovation—Ongoing efforts such as the use of the NPAC/SMS for migration to IP networks and the adoption of new NPAC/SMS interfaces, which reduce Industry cost and open new mechanisms for network optimization, will be jeopardized.

- Degraded emergency preparedness—Instability or inconsistency in LNPA service would ultimately impact public safety, in the form of inadequate operational expertise for disaster recovery and service restoration in times of greatest need.

- Loss of consumer confidence in Number Portability—Analysis of international number portability platforms indicates that as ports take longer or become less reliable, there is a detrimental impact on market competition, **threatening new entrants and smaller Service Providers**. U.S. consumers are estimated to have gained in total a world-leading $8 -$10 billion per year in 2005-2010, based on the benefits of wireless number portability.[6] This exceptional result can be traced almost entirely to a fast, reliable, and nationally homogeneous consumer porting experience—all stewarded by a high-performing LNPA.

Neustar's Proposal to Serve as the U.S LNPA 2015-2022

Neustar's Full Combined Proposal for nationwide LNPA service meets the immediate and long term interests of the telecommunications industry, and completely eliminates the risk of transition or segmentation. In addition to the highest levels of performance, most experienced and knowledgeable management team, and committed investments to support the Industry's future requirements, Neustar's proposal includes several improved financial terms:

- Nearly [HIGHLY CONFIDENTIAL] in immediate savings to Service Providers in year one of the new contract term

- Fixed pricing model that completely eliminates cost uncertainty

- [HIGHLY CONFIDENTIAL] reduction in effective rate per transaction over the course of the contract (depending upon adoption of NPAC/SMS-based IP interconnection)

- An additional [HIGHLY CONFIDENTIAL] in incentive credits, providing additional near-term value to the Industry aligned with increased value in the NPAC/SMS

- Over [HIGHLY CONFIDENTIAL] of additional costs absorbed in the contract, including current and future SOW's, reduced Direct Charges, elimination of bad debt exposure, and enhanced performance guarantees

6 Hal Singer, Navigant Inc. Mr. Singer's research into the economic benefits of number portability finds that consumer utility degrades sharply as a factor of LNPA performance, including around longer versus shorter porting intervals.

- Zero marginal cost for usage, encouraging innovation and incremental value
- Up to [HIGHLY CONFIDENTIAL] in additional benefits associated with NPAC/SMS innovations
- No transition risk for the Service Providers or for consumers

In conclusion, we thank the NAPM, LLC and the FCC for the opportunity to present Neustar's proposal to serve an extended term as the U.S. LNP Administrator. Neustar's selection will build upon the extraordinary value of U.S. Local Number Portability delivered to consumers, Service Providers, and state and federal regulators for the past 15 years. We are confident that our selection will guarantee continued performance, partnership, and innovation to the Industry and the FCC, and offers by far the greatest value and the lowest risk to Service Providers and their customers.

1.0 TECHNICAL FACTORS

Why Neustar

- Depth and breadth of LNP Administration services exceeding stated requirements delivered by highly praised service team with unmatched expertise in all aspects of LNPA service
- Highly resilient and scalable NPAC/SMS with high availability, high reliability, and ample capacity to easily accommodate the requirements in the future
- Exceptional system performance, compliance, and customer satisfaction results generated due to unique experience and custom-built operational excellence program

Security-Related Information

- Continued committed investments and innovations in recognition of growing Industry requirements, included at no cost
- Avoidance of costly and risky Industry-wide transition

During the next term, Service Providers will rely on the NPAC/SMS and the LNPA to acquire tens of millions of new subscribers, assign enough telephone number inventory to handle an explosion of machine-to-machine devices, and execute massive migrations to IP network technology. The LNPA is called upon to operate a highly complex service registry with thousands of stakeholders and billions of monthly interactions, act on the direct needs of Service Providers individually and in collaboration with one another, provide consultation and support for regulatory interests, and steward the policies associated with market competition and interconnection. This requires:

- **Technical expertise** sufficient to operate a geographically diverse, multi-layer platform architecture at the levels of security, stability, and flexibility reflective in light of the NPAC/SMS's strategic importance to the Industry
- **Unparalleled knowledge and expertise** in numbering and network administration across all telecommunications market segments to deliver the LNPA service with concrete understanding of our customer's business challenges
- **Operational excellence** approach sophisticated enough to maintain exceptional performance in a fast-changing environment—including regulatory policy, technology evolution, Industry change management, and shifting consumer demand

Each one of these attributes by itself is essential to the U.S. LNPA's function, requiring a focused corporate commitment to high performance. Only in combination, however, do they provide the communications Industry with the full service and value that Service Providers and consumers require from the LNPA. Proposal Section 1.0 describes the various aspects of the service we have administered for fifteen years, highlighting Neustar's outstanding record of achievement against consumer expectations and Service Provider requirements. It also provides a survey of the immediate investments and long term innovations to which Neustar is committed for the next contract term, and describes our uniquely tailored methods and procedures for operational excellence and security, which will continue to provide comfort and confidence to the Industry and the FCC for the next decade.

Outstanding Value from Performance and Innovation

Neustar's achievement against Industry expectations for availability, performance, and customer satisfaction have been exemplary, and distinguish our proposal from any other Respondent's. Over the last five years, there have been 11,340 distinct contractual service level measurements of the NPAC/SMS and the LNPA service— as displayed in Exhibit 1.0-1, Neustar has met or exceeded 11,333 of the Industry's requirements—a 99.94% success rate. These results come from years of hard-won experience in a unique technical and operational environment, and would not be easily duplicated by an untested vendor.

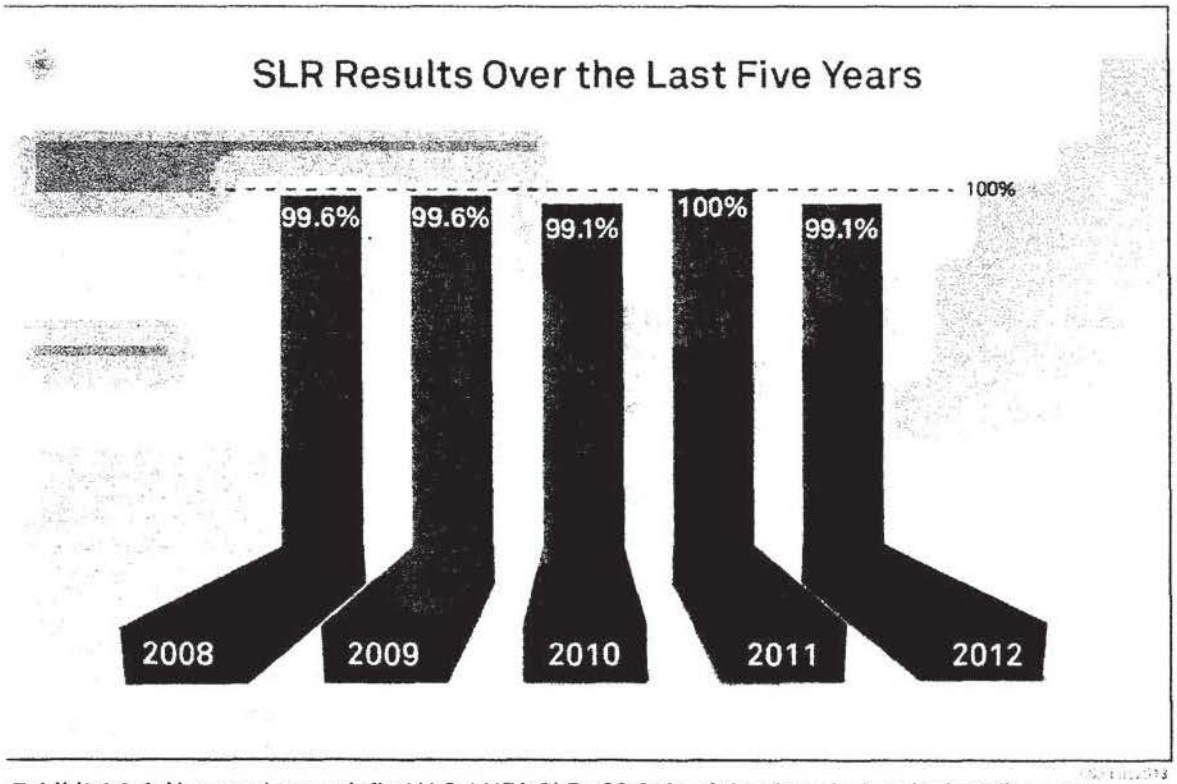

Exhibit 1.0-1: Neustar has satisfied U.S. LNPA SLRs 99.94% of the time during the last five years.

For the next contract term, the NAPM, LLC has raised the bar on several key service level requirements. In light of the increasing strategic relevance of the NPAC/SMS to the Industry's essential business objectives over the next decade, Neustar enthusiastically agrees to the new SLRs and intends to continue its record of exceeding Service Provider expectations.

In some instances, adhering to the new requirements will require additional investment into the NPAC/SMS architecture. Neustar is by far the vendor best suited to meet these higher standards without any Service Provider disruption; given the complexity of the NPAC/SMS production environment and the impacts associated with altering it for any purposes, any other vendor would face enormous obstacles in doing so. As part of an extended contract, Neustar commits to making these investments at no additional cost to the Industry.

Table 1.0-1 provides an overview of the Industry's requirements, an assessment of Neustar's current performance against the metrics, and how Neustar intends to support any changes from current operations. In addition to the LNPA's contractual service level requirements, Neustar's performance is evaluated annually by representatives across the communications Industry, in terms of our teams' responsiveness, timeliness, neutrality, knowledge, clarity of communication, and urgency with which we address customer needs. Neustar uses the customer survey process to validate methods and procedures for operational excellence, set individual performance targets, and identify any areas where we can improve our service to the Industry. Neustar's recent scores from our many customers were spectacular—and 2012 was our best year ever with a score of 3.84 (out of a possible score of 4) across all measured categories.

Table 1.0-1: SLR Overview

New SLR	Description	RFP Requirements	Performance / Plans for 2015-2022
1	Service Availability	99.99% Availability—**increased from 99.9%**	Greater than 99.99% availability in 2012 *New for 2015:* Introducing additional local and site-failover automation to restore service quickly and without disruption for Service Providers
2	Scheduled Service Unavailability	As Agreed by Parties	All SLRs met in 2012
3	Partial Service Unavailability	10 minutes to restore service—**new SLR**	See SLR 1; local and site-failover automation supports SLR 3 as well
4	LSMS Broadcast Time	3 second average response time—**decreased from less than 60 seconds**	Average 30 millisecond response time in 2012
5	SOA to NPAC Interface Rates	99.9% of transactions maintain a min of 7 CMIP tps—**increased from 95%**	Average above 99.9% in 2012 *New for 2015:* Introducing additional application layer optimization to accommodate increased throughput
6	NPAC to LSMS Interface Rates	99.9% of transactions maintain a min of 7 CMIP tps—**increased from 95%**	Average above 99.9% in 2012 *New for 2015:* Introducing additional application layer optimization to accommodate increased throughput

New SLR	Description	RFP Requirements	Performance / Plans for 2015-2022
7	SOA-LSMS Interface Availability	99.99% Availability—**increased from 99.9%**	100% availability in 2012 *New for 2015:* Ethernet connectivity options available to support increased redundancy and bandwidth
8	Unscheduled Backup Cutover Time	Maximum of 10 minutes to cutover to the backup site	All SLRs met in 2012
9	Partial Disaster Restoral Interval	Equal to or less than 4 hrs—**decreased from 24 hours**	All SLRs met in 2012
10	Full Disaster Restoral Interval	Equal to or less than 6 hrs—**decreased from 48 hours**	All SLRs met in 2012
11	Administration of Any NPAC/SMS Table	99.99% error free—**increased from 99.5%**	All SLRs met in 2012
12	User Problem Resolution, Average Speed of Answer	Minimum of 90% of calls answered by live operator within 10 secs (during normal business hours)	Average over 99% calls answered within 10 seconds in 2012
13	User Problem Resolution, Abandoned Call Rate	Less than 1%abandoned call rate—**decreased from 2%**	.1% Abandoned call rate in 2012
14	User Problem Resolution, After Hours Callbacks	99% callback within 15 minutes (outside normal business hours)—**decreased from 30 minutes**	Two SLRs missed in 2012, due to failure of after-hours voice mail system (replaced 3Q 2012) *New for 2015:* Migration to 24x7 Help Desk
15	User Problem Resolution, Commitments Met	100% commitment to get back to User—**increased from 99.5%**	100% compliance in 2012
16	Logon Administration	99.5% of all approved request within 6 hrs of receipt—**changed from 12hrs and increased from 99%**	100% compliance in 2012
17	Unauthorized System Access - Security Error Log	Monitor and record unauthorized access	All SLRs met in 2012
18	System Security Remedy Invalid Access Event	Remedy logon security permission errors immediately after user notification	All SLRs met in 2012
19	NPA Split/Mass Changes	Notify User within 10 days business days of receipt of notification of the need for NPA Split/Mass Change	All SLRs met in 2012

New SLR	Description	RFP Requirements	Performance / Plans for 2015-2022
20	Unscheduled Service Unavailability Notification —Upon Detection	Notify User within 15 minutes of detection	All SLRs met in 2012
21	Unscheduled Service Unavailability Notification — Update	Provide 30-minute updates	All SLRs met in 2012

In the next term, Neustar's proposal includes additional investments into all technology and people behind the LNPA service, including expanded help desk features and hours, and expanded options for User training. We also propose opening additional options for Service Provider testing, including full simulation and automated scenario testing in a full production mirror NPAC/SMS environment.

We have begun design and implementation for a fully redesigned NPAC Portal to consolidate the majority of existing online interfaces to the NPAC/SMS, including the Low-Tech Interface and NPAC.com. The Portal will offer, to all NPAC/SMS users, enhanced query and reporting functions to built on the foundation of Neustar's Port PS platform, in production today and relied upon by thousands of Service Provider users for intuitive access to complex number inventory data. More than anything, Neustar's selection will include a bedrock commitment in continued LNPA and NPAC/SMS performance in a time of unprecedented change for the Industry.

Proposal Sections 1.1 LNP Administration Services and 1.2 NPAC/SMS Technical Design describe in further detail the various aspects of the LNPA Service and the NPAC/SMS – including the unique custom-built methods we use to deliver high availability, scalability, performance, and user value. The sections also provide further detail regarding each of the enhancements to NPAC/SMS Neustar proposes for the next contract term.

Proven Operational Excellence and Security

Neustar has exceptional record of performance in an environment of incredible complexity and precision as shown in Exhibit 1.0-2. We employ market-leading best practices in help-desk operations, billing assurance, system performance monitoring, disaster recovery, failover testing, and root cause analysis as validated and certified by external auditors each year. We have developed a proactive and predictive approach to all aspects of the LNPA service, operating with absolute rigor and precision to eliminate any and all risk to Service Provider data and access to essential functions. Our operational excellence program combines holistic performance monitoring and internal controls with comprehensive external auditing, Industry benchmarking, and reporting. Not content to simply adhere to the standards used by point solutions and internal platforms, we have customized Industry certifications (such as ISO-9001) to specifically address the unique needs of the NPAC/SMS.

Neustar's Exceptional Record of Performance

Impressive Service	
Overall Customer Satisfaction score (2012)	**3.84/4.0**
Provisioning Accuracy	99.9%+
First-call resolution	80%+
Compliance with performance metrics	99.9%+
Services Audits (2008–2012)	
Gateway Evaluation Process (GEP)	100%
Data Center Operations (Article 14)	Exceeds Industry Best Practice
Benchmarking Process	100%
New User Evaluation (NUE)	Affirmative
Local Number Portability Enhanced Analytical Platform (LEAP)	100%
Intermodal Ported Telephone Number Identification (IPTN)	100%
ISO 9001:2000 Certification (2008-2012)	Certified with 0 non-conformities
Se	
CEO-led operations review	Monthly
Disputes requiring FCC attention	0
Robust System Specifications	
[illegible]	
Number of distinct Service Provider accounts	4,800+
Number of provisioning and distribution points (SOAs/LSMSs)	604/243
TNs under NPAC management	620 Million +
Populated data fields in NPAC	5 Billion +
Time to broadcast a change to the entire telecom network	7 seconds
Billable transactions per year	500 Million +
Actual interactions per year	12 Billion +

Exhibit 1.0-2: Nuestar's operational performance spans all aspects of the LNP ecosystem with superior results.

Given the significance and sensitivity of data provisioned in the NPAC/SMS and the severe consequences of a potential breach in the operation of the NPAC/SMS, Neustar follows a comprehensive "defense-in-depth" security program designed to mitigate current threats and anticipate the next generation of threats. Neustar employs Industry experts in cyber-security. We have brought the full weight of our corporate expertise to bear upon ensuring that all aspects of LNP Administration—database, network, facilities, and personnel—are equipped with the most advanced tools and best practices to protect Service Provider data and assets. Security-Related Information

Neustar's continued selection as the LNPA allows the Industry and the FCC to proceed with absolute confidence in the security of NPAC/SMS data and processes in the next term.

In the next contract term, Neustar proposes to expand the audits and certifications to which the LNPA is subjected on an annual basis—including an ISO 9001 alternative used exclusively by the telecommunications industry, TL 9000; and additional information security and business continuity audits. We also propose bringing the full weight of our unique experience in cyber-security and risk mitigation to bear by applying all relevant aspects of NeuCirt/SOC to the LNPA service. In combination, these investments on top of Neustar's already exception performance offer Service Providers and the FCC even greater confidence than today in the absolute reliability and security of the NPAC/SMS and its Administrator.

Proposal Sections **1.3 Neustar's Approach to Operational Excellence for LNPA** and **1.4 Neustar's Security** demonstrate our unmatched understanding of, and competency in, all operational performance aspects of our LNPA service and NPAC/SMS and comprehensive, multiple-layered "defense-in-depth" approach to physical, process, and platform security. The sections also describe in more detail the additional enhancements Neustar commits to pursuing for the next contract term.

To Innovate or to Replicate?

The upcoming decade will be one of unprecedented change for Service Providers. The NAPM, LLC's RFP for post-2015 LNPA service recognizes the NPAC/SMS's relevance for PSTN-to-IP transition and as the current LNPA Neustar has already begun the process of facilitating collaboration and investing in technology to support this critical network evolution. But IP transition is only part of the Industry's challenge over the next decade – even as existing facilities are retired in favor of next-generation infrastructure, a massive wave of connected devices in the form of machine-to-machine is expected to surge provider networks, new market entrants with innovative business models will compete for resources and subscriber walletshare, and consumer demands for mobility, personalization and convergence will continue to rise. Each of these market developments has significant implications for telephone number administration and assignment, and the NPAC/SMS will be an essential focal point for Industry collaboration and innovation. In selecting Neustar, the Industry will know for certain that the foundation for Service Provider interconnection over IP networks is reliable and secure, allowing Service Providers to align their resources and focus their investment on the needs of the future.

In addition, in recognition of Neustar has described in this proposal several innovative enhancements to the NPAC/SMS for the next contract term, all designed to meet the challenges and opportunities of the next decade and to provide the highest possible value to the Industry and consumers. The NPAC/SMS's unique design creates the potential for significant cost savings, end-user service improvements, and revenue opportunities for Service Providers as their networks and subscribers adjust to a changing market.

Table 1.0-2, excerpted from Proposal Section 1.5, provides a high-level view of potential NPAC/SMS enhancements, their associated market drivers, and the potential value to Service Providers of their adoption. For further detail, we have also included a series of white papers that explore several of the included enhancements items in greater detail. Through the use of ample annual SOW credits included in Neustar's proposal, the Industry can receive these enhancements at no additional cost.

new

Table 1.0-2. Potential NPAC/SMS Enhancements

NPAC Roadmap Item	Value to Service Providers
National IP Interconnection	• Accelerated Industry adoption of standards and protocols for interconnection in a post-PSTN environment • Avoids expense of building new numbering registry by leveraging existing NPAC architecture and governance • All integration and application functionality is present in existing NPAC
Consolidated POIs and Network-Aware Provisioning	• Avoids need for central office / point-of-interconnect in each LATA, in favor of optimal network design unconstrained by PSTN geographic rules • Efficient roll-out of VoLTE networks based on dynamic route provisioning as subscribers move between 4G/3G coverage areas
Individual TN Pooling	• Efficient use of numbering resources • Reduced burden for utilization/forecast reporting for participating Service Providers
Machine-2-Machine Administration	• Accommodation for significantly increased demand for TN resources, deferred area code exhaust • Increase value of M2M devices on Service Provider networks by maximizing interoperability options
TeRQ Protocol Enablement	• Offers a standard, authoritative, policy-rich query capability for Service Provider information exchange • Provides a template for post-ENUM interconnection and service enablement
TN Certificate Authority	• Increased security for TN-addressed messages over the internet (e.g. Caller ID, mobile finance) • Opportunities for Service Providers to differentiate in the market for mobile Internet identity services
Fixed Line SMS Interoperability	• Expansion of fixed line / over-the-top SMS providers (increased network effect and volume) • Universal distribution of white-listed telephone numbers to SMS ecosystem through LSMS broadcast • Reduced spoof and spam as a result of authoritative and transparent NPAC population
Equipment Identity/Stolen Handset Registry	• Reduced fraud due to stolen devices (13M estimated lost/stolen smartphones in 2013) • Accelerated compliance with FCC requirements • Leverages existing NPAC infrastructure and interfaces
ElementOne Analytics Platform	• Advanced analytics built on NPAC data, in support of business decisions related to subscriber acquisition, network management, inventory utilization

The alternative to selecting Neustar for an extended contract term is to assume the cost and risk of an unprecedented Industry-wide transition. Neustar has estimated the potential costs to the Industry's thousands of constituents of a transition to a new LNPA vendor as reaching $719M in the first year—arising not only from the extensive development and testing required to migrate thousands of Service Providers to a brand new platform on an aggressive and fixed schedule, but also from the certain impacts to consumers and Service Providers from missed calls and texts, delayed porting schedules, postponed network upgrade activities, and impeded access to new telephone number inventory. The best possible outcome of such a transition, after all costs were incurred and risks were realized, would be an LNPA service that approximates the level of service the Industry is currently receiving today from Neustar – and a great deal of energy and expense that could have been spent focusing on the future would instead have resulted in, at best, a replication of the status quo.

Proposal Section 1.5 Future NPAC/SMS Innovations describes Neustar's proposed innovations, above and beyond the requirements of the RFP and subject to future discussion with the Industry. **Proposal Section 1.6 Transition and Implementation** describes Neustar's view of the impacts and pitfalls of NPAC/SMS transition to one or more alternate vendors. By selecting Neustar as the LNPA vendor for the next contract term, the Industry will continue to receive seamless outstanding performance AND committed partnership in innovation, without subjecting the Industry and consumers to an unnecessary and extraordinary risk and expense of an LNPA vendor transition.

Throughout our proposal, we have highlighted several items to assist evaluators in understanding the differentiators of Neustar's solution.

The Neustar Difference—highlights the elements of our proposal that are unique to Neustar's LNPA service, whether because they will not transfer to an alternate vendor with the service or because they represent expressions of Neustar's unique experience and management team.

New for the Next Term—identifies what we propose in the next term, different from what Users experience today from the NPAC/SMS. This distinction includes many items of which the NAPM is already aware, since they were initiated during our current tenure but are not yet in the production system.

1.1 LNP Administration Services

Why Neustar

- Fully compliant service in place today provided by personnel possessing hundreds of man-years of relevant numbering and porting experience
- Proactive solutions addressing future needs of our customers while assuring all our constituents of high-quality service delivery at stellar performance levels
- Demonstrated record of continuous improvement in processes and technologies that deliver superior service

New for the Next Term

- Enhanced customer experience via the new NPAC Portal which will provide Web 2.0 features like "Chat with an Expert"
- All NPAC registration and user profile forms will be available for submission via the NPAC portal in a secure manner
- A new NPAC/SMS test capability, available via the NPAC Portal, offering both predefined and customized test cases, to allow Service Providers to test when convenient
- Dedicated 24x7x365 customer support team
- Customized User profile development process based on a set of hierarchical questions

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At first glance, the LNPA role may appear straight-forward: the NPAC must always be available and able to process hundreds of millions of transactions each year. The system is designed to be unaligned with any specific technology or service segment and the administration is required to be neutral. The NPAC is a critical part of the infrastructure of the North American communications Industry, needed to support the billions of interactions that occur each day. The LNPA is the bedrock upon which the Industry competition mandated by the Telecommunications Act of 1966 is built. Neustar, in collaboration with the Industry, has surpassed the original mandate to design, develop, operate, and maintain a compliant NPAC/SMS and together has transformed the NPAC into a powerful tool—the NPAC today is much more than merely processing bytes of data.

The LNPA must:

- Understand the intent of Industry-developed business rules when enforcing them so they are enforced appropriately
- Provide numbering expertise to a wide audience of interested constituents
- Recognize that the NPAC is a part of a larger communications ecosystem that relies on NPAC services being accurate and always available and how NPAC services affect downstream services and Industry objectives
- Evolve the service in lock step with Industry's needs today and in the future to continually improve the value to Industry
- Operate with unassailable neutrality

The Industry has a partner in Neustar that fully understands that the responsibilities of the LNPA extend beyond designing, building, implementing, and operating the NPAC/SMS to:

- Enforce LNP business rules and disseminate data
- Provision LNP orders
- Provide user support
- Provide user training
- Process invoices accurately

Additionally, Neustar goes above and beyond and delivers additional, vital services to meet the expectations of an evolving and competitive customer base. As evidenced by Exhibit 1.1-1, Neustar appreciates what it takes to provide services that continually keep pace with the needs of the Industry and surrounds the "core services" with value-added functions like:

- **Provisioning support**—we process hundreds of millions of complex transactions on behalf of all Service Providers.
- **Service management**—we monitor the entire LNP ecosystem and proactively reach out to Service Providers when their Local Service Management System (LSMS) or Service Order Administration (SOA) systems appear to be responding slowly.
- **Knowledgebase**—our expert and experienced personnel are always available to address questions and attend various industry forums, most notably the LNPA-WG, to present solutions to issues.
- **Disaster preparedness**—we support the Industry in recovery, via number portability, of communications services in the event of a disaster.

neustar.
Real Intelligence. Better Decisions.

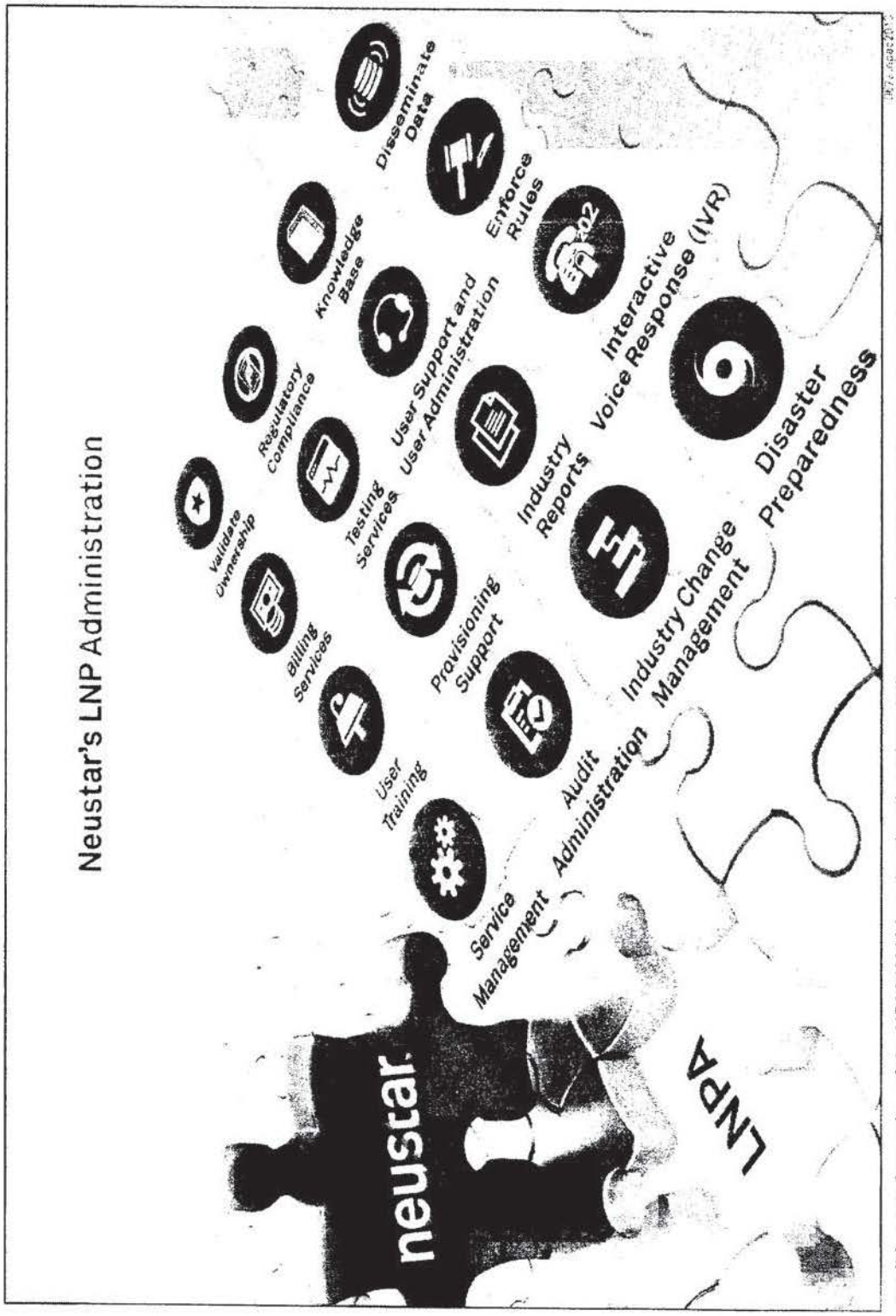


Exhibit 1.1-1: Operation of the NPAC/SMS is only a fraction of the full suite of invaluable functions performed by Neustar as the LNPA.

Neustar is acutely aware that the NPAC is not merely a database that processes transactions, but is rather about our people understanding the nuances of numbering and the specifics of portability to ensure success on behalf of our carrier customers.

> "I couldn't run my department without NeuStar and the trust I have in their knowledge."
>
> NPAC User Survey 2011

The following section sets forth the services—both "core" and "value added"—that Neustar will continue to provide for the next term.

1.1.1 Manage the User Administration Process

Access to the NPAC and use of NPAC data is strictly controlled and limited to specific, permitted uses. Neustar has successfully developed and implemented various processes to thoroughly review applicants to ensure compliance with the NPAC qualification process, all in an effort to safeguard NPAC data. We understand the complex interactions that take place as Service Providers and providers of telecommunications-related services (PTRS) interact with the NPAC for the exclusive purpose of routing, rating, or billing of calls, or for performing network maintenance.

A Primer on Number Portability in the U.S.

For a long period of time. the telephone number was all the information that carrier networks needed to route calls and establish connections using the first six digits (the NPA-NXX) to identify the specific switch in the network that served a particular customer.

The FCC Orders on Number Portability changed the status quo by focusing on movement of geographic numbers (not "toll-free" numbers) from one node in the Public Switched Telephone Network (PSTN) to another. For wireline service providers, these nodes in the PSTN networks are central office switches to which consumers telephones are connected. For wireless service providers, the NPA-NXX code points to the Home Location Register (HLR) containing internal network routing information. As depicted in Exhibit 1.1-2, the movement of telephone numbers from one PSTN node to another requires that there be a mechanism to associate a separate NPA-NXX code with each number that is ported since the ported telephone number no longer contains the NPA-NXX that identifies the serving switch. This appended address is the Location Routing Number (LRN) associated with each ported number in the NPAC database.

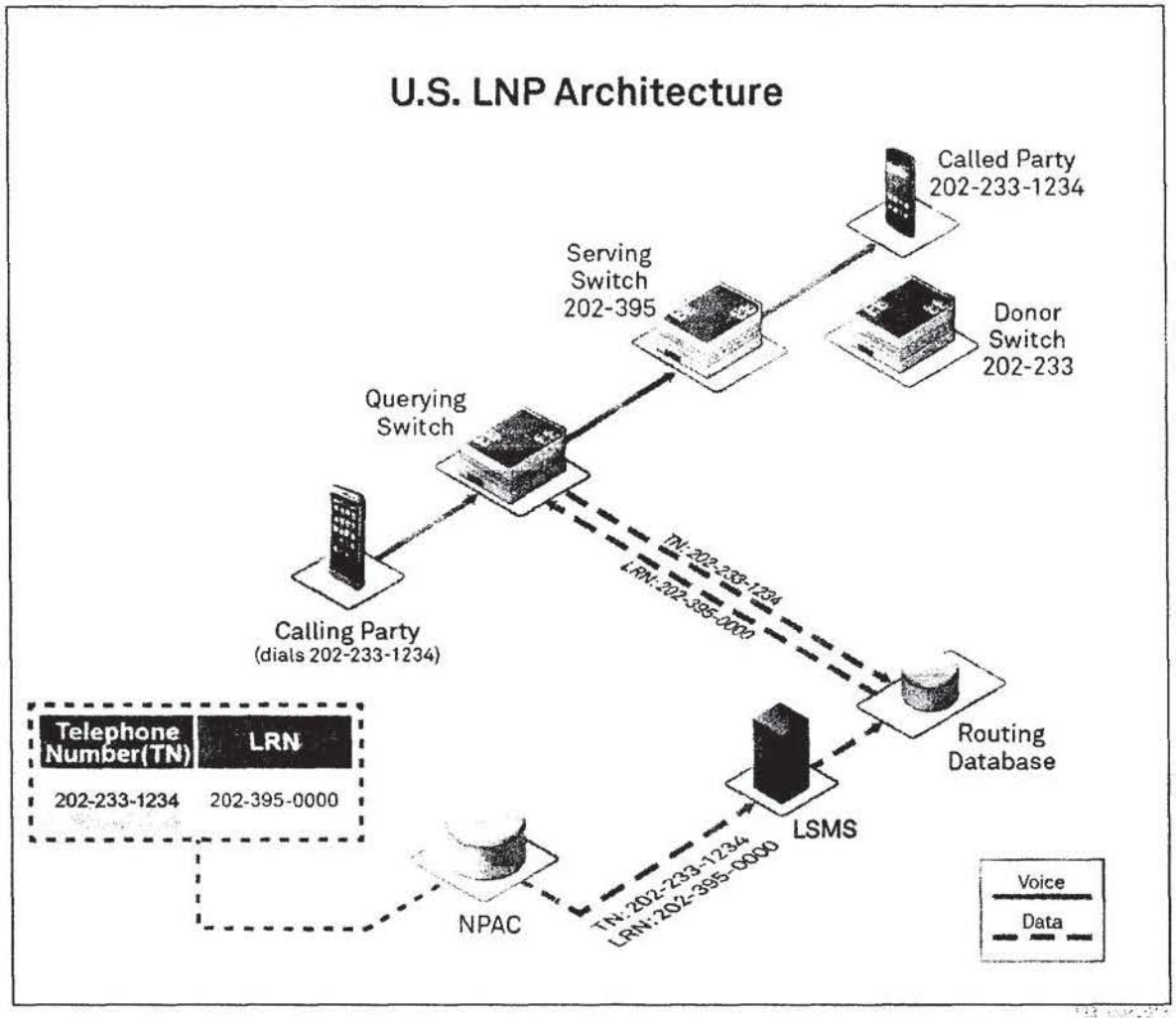


Exhibit 1.1-2: There are no self-healing options if the NPAC database propagates incorrectly.

Implementation of this LRN technology enables the telephone network to interrupt call processing and query a local database to identify the serving switch for a specific telephone number. This means that the NPAC, which propagates this information, has to be the "golden database". There are no self-healing options available if this golden database sends information incorrectly. As demonstrated in sections below, at Neustar, we strictly control access to the data to preserve the integrity of this golden database.

Stringent Enforcement of Evaluation Criteria to Qualify for Access to NPAC Data

Potential NPAC customers often contact Neustar with minimal information on how to become an NPAC User and are unaware of the stipulations for Permitted Uses of NPAC data, the ways to access this data, and ways to use NPAC services upon becoming an NPAC User. Neustar has made available a dedicated team of employees within the Customer Connectivity Services (CCS) group that guide and manage the deployment and set-up processes for potential and existing Users of the NPAC. As shown in Exhibit 1.1-3, NPAC Users fall into two broad categories:

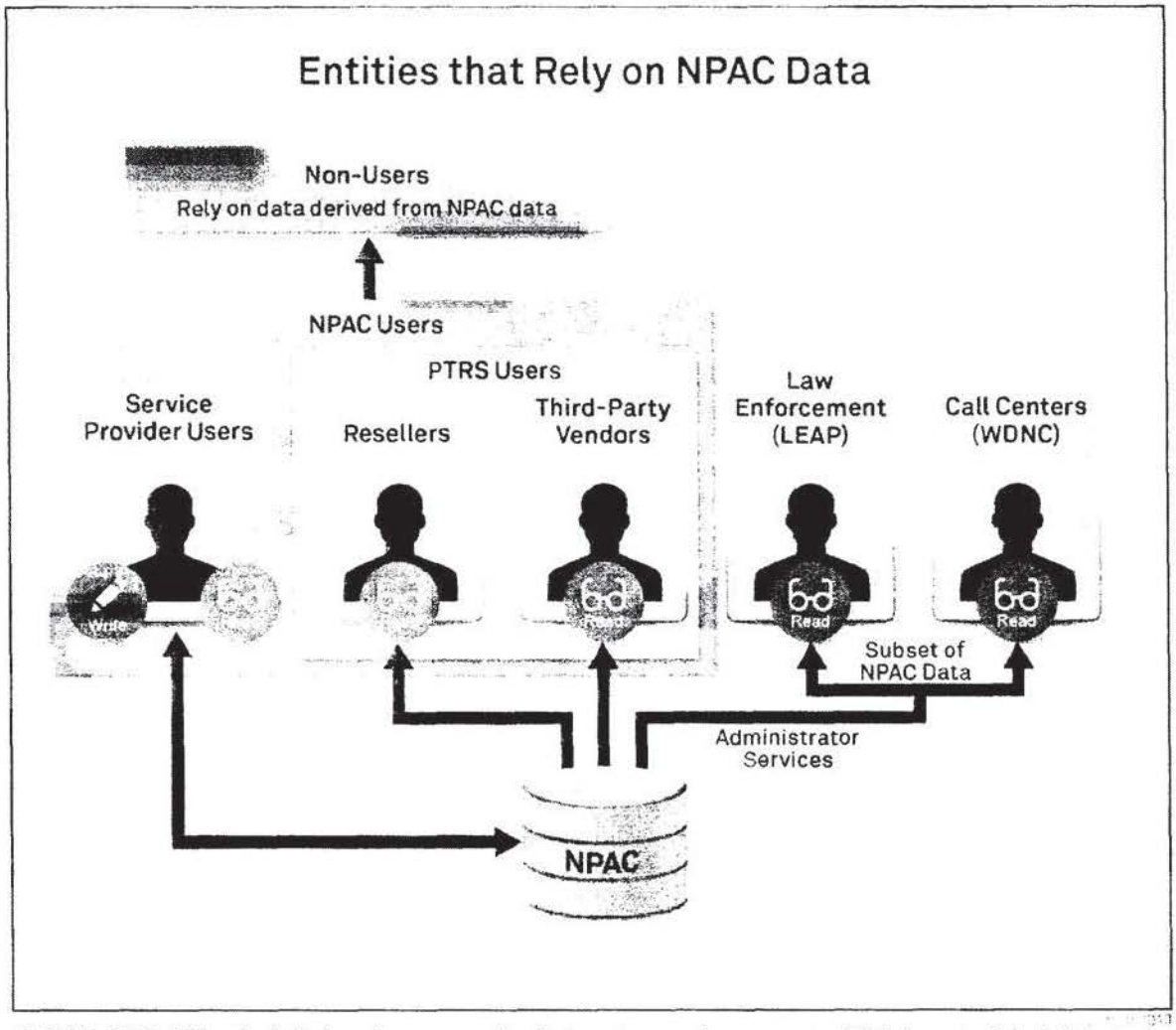


Exhibit 1.1-3: Effectively balancing competing interests requires a neutral third-party Administrator.

1. **Users with read and write privileges**—Service Providers are entities eligible to receive numbering resources such as NPA-NXX code assignments from the North American Numbering Plan Administrator (NANPA).

2. **Users with read-only access**—Providers of Telecommunications Related Services (e.g. third-party vendors, messaging aggregators, and resellers of telecommunications services).

Only those entities that are assigned numbering resources by the NANPA (and the National Pooling Administrator) are eligible to create, modify, and delete NPAC records. Currently, these are the entities that operate local switching nodes in the PSTN.

Many entities that do not qualify for NPA-NXX code assignments provide wholesale and retail telephone services by obtaining telephone numbers from the PSTN Service Providers and using the PSTN Service Providers' central office switches as PSTN gateways. While these entities do not route traffic between nodes of the PSTN, they may need

access to NPAC data for other reasons, such as to request a Customer Service Record (CSR) when facilitating a port request, to determine when customer billing should start, or to select a Least Cost Route when they have access to multiple Service Providers' PSTN gateway switches.

There are instances where NPAC data can reflect information of the provider behind a PSTN Service Provider. For instance, a "class 2 interconnected VoIP" provider must rely on its PSTN partner as a source of telephone numbers and to act as a PSTN gateway. It also must rely on its PSTN partner to create information in the NPAC database to identify it as the serving provider for the telephone number as well as to indicate other information pertinent to the service arrangement. By populating the "altSPID" field to identify the VoIP provider, the PSTN Service Provider indicates to users of NPAC data that the VoIP provider is actually providing telephone service for the number. If the VoIP provider were prepared to accept calls directly in the form of Internet traffic, the PSTN partner also could indicate that on the NPAC record (by noting that the "SV type" is "class 2 interconnected VoIP").

Comprehensive User Administration Process

Over the years, Neustar has developed unique qualifications that allow us to quickly determine the appropriate category a potential user should belong to and grant appropriate privileges to protect NPAC data. Neustar also has developed and implemented extensive logging capabilities that allow us to track system operations to maintain compliance with policy.

This thorough understanding of the requirements and their deliberate application allows only NPAC customers with read-write capabilities to create records in the NPAC database, which they then own, and can modify or delete, thereby ensuring data integrity. As show in Exhibit 1.1-4 and described further below, the CCS team provides dedicated, one-on-one support to potential and existing NPAC customers—from application evaluation, initial deployment requests, to modifications to access/services.

- **Application Qualification**—as a pre-requisite to all deployment activities, a Non-Disclosure Agreement (NDA) is provided to the applicant. Once an NDA is executed, the New User Application is reviewed to determine the applicant's eligibility for NPAC services. Prior to setting up access to the NPAC, the CCS team:
    - Obtains evidence that a state regulator in the NPAC region has granted a wireline applicant a certificate of Operating Authority and confirms that the applicant is eligible for NPA-NXX code assignments. For a wireless carrier, this operating authority evidence is its FCC radio license. Only those applicants that pass this screening are provided with read-write access to the NPAC.
    - Confirms, under the NUE process, that PTRS applicants are in fact providing, or intending to provide, a telecommunications-related service, that the service is impacted by porting and pooling, and that the use of NPAC data contemplated by the applicant involves or facilitates the rating, routing, or billing of a call, the performance of network maintenance and, thus constituting a Permitted Use. Applicants passing this screening are provided with read-only access to the NPAC.
        - In some cases, qualifying a PTRS applicant may be raised to the NAPM LLC. Once an application has been approved, User Agreements (UA) are processed for each NPAC region in which the applicant intends to access NPAC data and the NPAC. In an effort to ensure only valid data is created and disseminated to the LNP ecosystem, the CCS team will continue to manage the list of authorized representatives as designated by service providers.

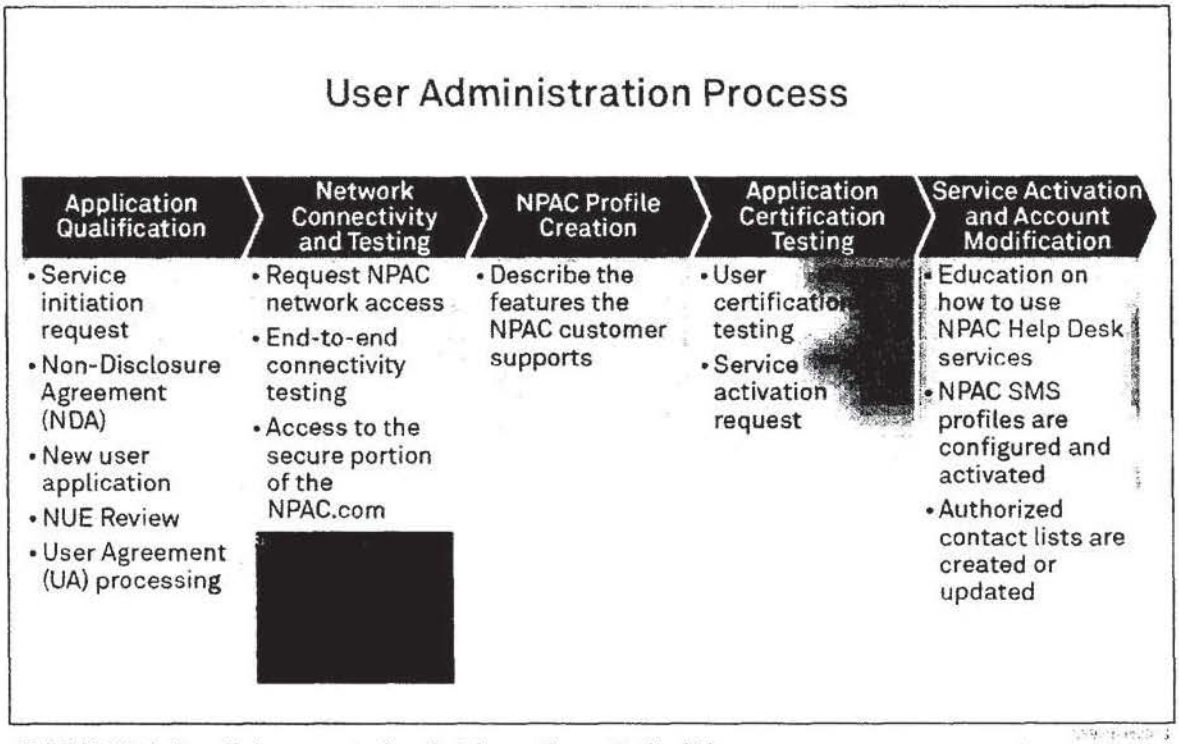


Exhibit 1.1-4: A well documented and stringently controlled User access process serves to ensure that only authorized entities can gain access to critical NPAC data.

- **Network Connectivity and Testing**—The method of network connection chosen depends on the type of interface (Mechanized or access by means of the new NPAC Portal) desired. Each connection method has a different set of activities associated with its setup. During the Network Connectivity phase, the CCS team works with the customer's network team, its IXC, and internal Neustar network engineers to manage network testing which includes end-to-end connectivity testing. To ensure no Service Provider's action causes NPAC/SMS service unavailability, Security-Related Information

During turn-up testing, Neustar verifies that these dedicated connections and access requirements have been met before proceeding to production turn-up. Neustar's CCS team sits at the center of this process and coordinates all of these activities on behalf of the Service Provider. In our role as gatekeeper, we understand how systems interact with each other. An inexperienced vendor may not fully appreciate the need for MCRs as an example and even view them as unnecessarily burdensome to manage without realizing that ignoring this one facet of the setup process can later result in the User (and its clients, in the case of a service bureau) to lose connectivity with the NPAC/SMS for an extended period.

- **NPAC Profile Creation**—An NPAC profile is created to indicate which NPAC data elements and services the User supports. The profile indicates to the NPAC/SMS which optional data elements it should expect to be populated, such as the altSPID field, and which process options should be applied, such as timed intervals. Thus the User's profile plays a role in its interactions with the NPAC and in the data disseminated to other Users on its behalf. For the next term, we are proposing changes to the profile development process to focus on specific, hierarchical questions that apply to a Service Provider—for example, an LSMS-only SPID will not be offered SOA-related settings, etc. Also, in the future, NPAC Users will have the ability to review and submit profile forms online.

- **Application Certification Testing**—Neustar is responsible for ensuring vendors and SOA/LSMS users successfully complete Certification Testing before a system is allowed to connect to an NPAC production region. User systems are certified against interface and service functionality requirements and only upon successful certification testing is a user activated to receive NPAC services. Neustar functions as the gatekeeper for all LSMSs and SOAs, by testing the reliability and integrity of changes through a series of test cases.

- **Service Activation and Account Modification**—During this phase, a User is made aware of ways that Neustar can provide assistance in the future. NPAC profiles are configured and activated, and authorized contact lists are created or updated. A profile also is created for the automatic TN-lookup system (IVR). Profile and contact list updates are an ongoing activity as Users modify their interactions with the NPAC over time by either adding regions or requesting additional functionality.

1.1.2 Enforce Business Rules and Disseminate Data

An elementary aspect of the NPAC/SMS service is to broadcast data associated with a single telephone number (or a thousand block), as directed by Service Providers. The NPAC system itself was designed to seamlessly implement hundreds of business rules, the permutations and combinations of which can result in hundreds of millions of rule interactions on a daily basis. Proposal Section 1.2.2, System Functionality, provides greater detail on system capabilities.

The NPAC/SMS must be a highly-capable system, however. LNPA personnel are also critical to ensuring that business rules are followed when assisting NPAC Users.

- Access rights are determined by need to obtain data. Evaluating requests for access to NPAC data is a very deliberate process to ensure access to NPAC data is provided only to those that are eligible to have it.

- Neustar employees act as agents on behalf of carriers and process transactions. An intrinsic understanding of business rules is necessary to assist customers with determining what can be done and in what manner. A sample listing of various business rules is provided in Table 1.1-1 below:

Table 1.1-1. NPAC/SMS Business Rules

Business Rule	Underlying Requirements
Creating TN or Thousand Bock records	• TN's LATA and its LRN's LATA must match • Thousand block's LATA and its LRN's LATA must match • DPC must be within stated ranges (in three sets of three digits) • SSN must be 000, if DPC value is entered on TN or thousand block record • DPC must be among those values listed as used by the SPID • First entry of TN (or block of TNs) requires five-day delay before activation • First entry of TN (or block of TNs) requires notice to LSMSs when a pending SV is created • NPA-NXX of a TN must be open before a pending SV for the TN can be created • LRN used with a TN must be owned by the SPID to which a TN is being ported • LRN used with thousand block must be owned by SPID for which block is created • Old SPID for port of non-ported TN must be owner of TN's NPA-NXX • Old SPID for port of ported TN must be owner of current SV for the TN • New pending SV cannot be created if there is existing pending SV • SPID entered for altSPID or Last altSPID in TN or thousand block record must exist in NPAC/SMS • SV Type may be different from SP Type; default is they are equal
Creating Network Data	• NPA-NXX must be assigned to OCN associated with SPID opening the code • NPA-NXX-X must be broadcast when "pending" block is created • SPID must be valid OCN; otherwise, SPID assigned by NSR
Other Rules	• Pending SV data can be viewed by only the old and new SPs involved in the port • Active SV or thousand block records can be viewed by an User • Network Data can be viewed by any User • "Write" permission is available only to Users categorized as "Service Providers"

Without intimate knowledge of what the rules dictate and what the rules mean, i.e., their spirit, not just their letter, it would be very difficult, if not impossible, to troubleshoot data or porting issues.

- A dedicated team of individuals applies LNPA knowledge and expertise to determine what kinds of access Users ought to have and how they need to interact with the NPAC system. Leveraging our experience, we are able to assist non-expert applicants to demonstrate they are eligible to access User Data and to describe their intended use of the User Data sufficiently to enable our third party New User Evaluator (NUE) to determine whether the eligibility and Permitted Use eligibility imposed by the NAPM LLC are met. For example, an applicant offering VoIP service often misunderstands the need to distinguish between a VoIP provider acting as a node on the PSTN (i.e., Class 1 Interconnected VoIP provider) from a VoIP provider operating "behind" a PSTN switch node (a Class 2 Interconnected VoIP provider). The former is a Service Provider with full read/write privileges, the latter a "PTRS" with read-only privileges.

- Our dedicated provisioning team handles the majority of incoming transaction processing requests for the Industry. The team is able to walk the inexperienced User through provisioning data requirements and explain it from the User's perspective.

- Neustar's dedicated Service Management team is responsible for ensuring the integrity of process flows is maintained while monitoring the LNP ecosystem (consisting of the NPAC, SOA, and LSMSs) for anything that might impede or halt porting activities.

- A dedicated Industry Change Management Administrator works with the Industry to develop, modify, and maintain LNP business flows and works internally to ensure LNPA WG requests to modify the NPAC/SMS are conveyed clearly to developers.

- Detailed and thorough User Methods and Procedures (M&Ps) are maintained by the Neustar Project Executive (PE). These M&Ps are a quick-reference guide on all things involving the NPAC and are relied upon by Service Providers to understand interaction between various business rules.

1.1.3 Address User Support Needs

Tier 1 Support

Currently, User Support is multi-tiered and is available with agents staffing the Tier 1 Help Desk during Business Hours and available on-call thereafter. For the next term, our Tier 1 support team will operate 24x7x365 versus on call. Our Tier 1 support team is based out of Louisville, KY but some Tier 1 employees operate remotely further enhancing business continuity by ensuring that User support is not subject to the vagaries of the weather or events in any one region. Tier 2 and Tier 3 support personnel are based out of our Corporate Headquarters in [redacted]. The Tier 1 NPAC Help Desk is the central point of contact for all provisioning and trouble related requests of simple and complex nature. Reasons Service Providers contact us include, but are not limited to the following:

- Interface and connectivity issues
- LSMS and SOA issues
- Number portability inquiries
- Processing SV requests
- New SOA/LSMS turn-ups
- LTI GUI logon requests

Due to the proactive nature of our support service, most potential trouble conditions are noticed and addressed before they are noticed by the NPAC User. Thus, most Help Desk contacts concern provision requests rather than trouble reports. As shown in Exhibit 1.1-5 below (data for 2012), of the top 10 categories describing why customers called our Help Desk, the majority of the questions received are porting and provisioning related: activates, disconnects, modifies of telephone numbers, or questions on the LNP business flows, bulk data downloads and testing, etc.

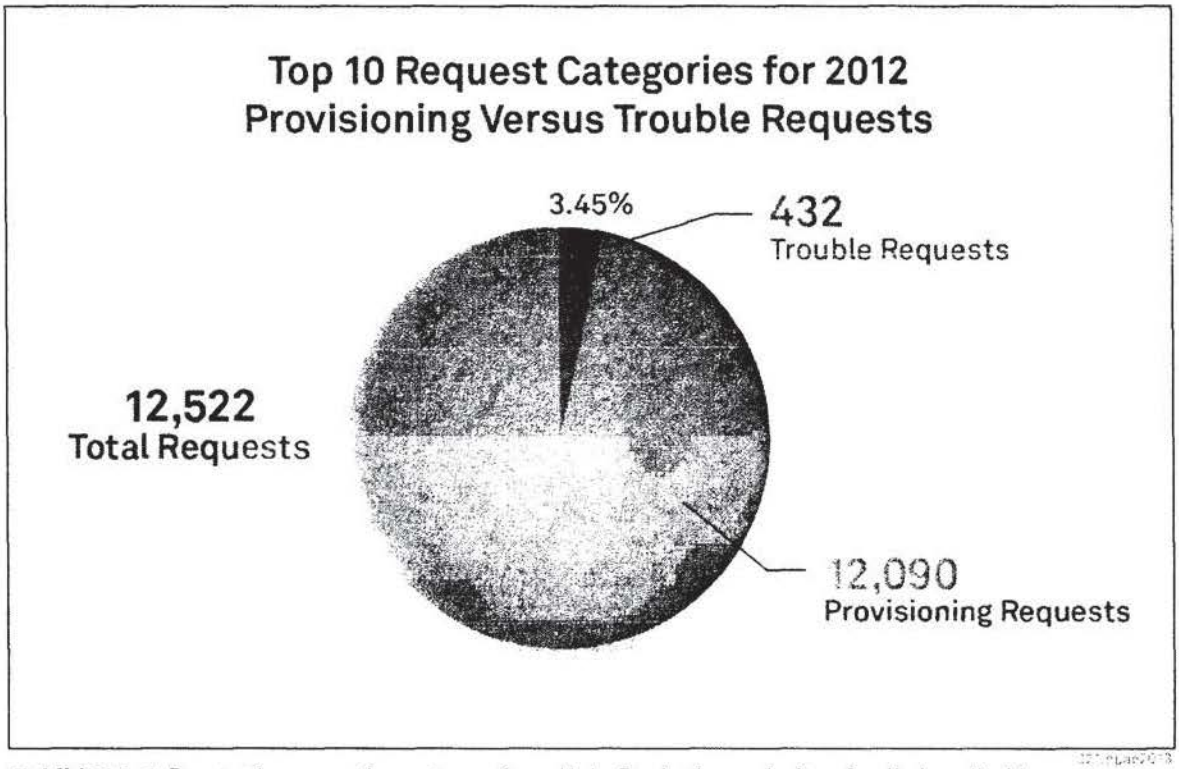


Exhibit 1.1-5: Due to the proactive nature of our Help Desk, the majority of calls handled by our team are to assist customers with provisioning and porting activities.

Authorized NPAC Users want the ability to access NPAC services and customer support experts by multiple channels. Such methods of communicating with the NPAC Customer Support team include phone, e-mail, and secure web portal via the NPAC.com. We are proposing the implementation of a "Chat with an Expert" option in the New NPAC Portal.

new

The ability to ask questions, submit various provisioning tasks for processing and obtain trouble resolution in a timely and accurate manner is often pivotal to the NPAC customer's success in providing LNP services to end users. NPAC customers want expert answers provided in a timely manner upon initial contact. Users want top quality, one-on-one, customer service and real-time 24x7x365 access to address LNP issues at any given time.

NPAC Users often use the Help Desk for SV Administration activities to create or correct NPA-NXX data once it becomes available for use. This task is important to help Service Providers manage their data. Specifically, data administration entails the following activities:

- Porting TNs and work with non-active and active SVs
- Managing NPA-NXXs, LRNs, and NPA-NXX-Xs and telephone number pool blocks
- Performing SV audits which are maintenance tasks used to troubleshoot SP problems and ensure data integrity

- Ensuring accuracy in processing manual billable requests
- Simplifying filter management for different types of customers at the NPA/NXX (6-digit) and NPA (3-digit) levels

End-user Support

In addition to supporting NPAC customers, we are often contacted by consumers (end users of Service Providers) requesting assistance to act as an intermediary. While not a contractual requirement, it is our belief that every query received by us deserves the same high-quality support regardless of whether the request originated from an NPAC User or not. As a recent example, we assisted one such consumer with a particularly difficult issue and helped resolve it to its logical conclusion. In response, one of our employees was recognized with the following accolade:

> "... I've had the pleasure of gaining the assistance from one of your staff members, Security-Related Information, in resolving a tough issue that I was unable to take care of on my own. In fact, without her persistence in following up for me, being a go between, I don't believe resolution would've ever been reached..... Although this process took several more days, the passing of lots of emails back and forth and follow up with many phone calls to different people on Jessica's part, she stayed with it right to the end... I am 100% convinced this wouldn't have happened without her!
>
> ...The kind of work ethic and professionalism that your staff member exhibited while assisting me is seldom seen these days. It deserves recognition."
>
> End user e-mail, 2013

The Neustar Difference

Our Tier 1 help desk operates at the level of a Tier 2 support center. Our team resolves approximately 80% of the questions on the **first call** without the need for additional troubleshooting. This high first-call resolution rate exceeds industry standards and saves NPAC Users significant time and expense, as the majority of issues are resolved right away. We can achieve this rate because the Tier 1 team has the necessary LNP knowledge and understanding of customer's LNP environments (which are serviced by multiple SOA/LSMS vendor systems) and can quickly determine solutions.

Neustar's ability to provide and process NPAC User requests accurately and in a timely manner is critical to preventing service interruption for NPAC Users. Any delay in processing requests can cause NPAC Users to miss system notifications. Overflow of unwanted notifications can bring a User's system down. LRN data errors due to delayed updates can cause service interruption to end users. Lack of understanding of NPAC business flows and timers can cause significant porting delays for NPAC Users. This ability to translate a customer's request into actionable items has meant that our personnel take approximately three minutes to address the majority of the calls that are received.

Our Tier 1 Help Desk team operates at the level of a Tier 2 support desk due to the investments that Neustar has made in training, monitoring systems, and tools provided to our Help Desk personnel. Our customers are the beneficiaries of this emphasis and results often times speak for themselves. As an example, only 0.36% of all tickets opened by our Tier 1 team were referred to Tier 2 (Applications Support) for assistance in 2012. No tickets were sent to our Tier 3 (Software Development) team.

> "I have never had to deal with anyone other than the Tier 1 support and they have always been great. Very friendly and helpful and they always get my problem fixed quickly."
>
> NPAC Survey 2011

Tier 2 Support

Neustar also makes available its **Tier 2 Application Support** team to further troubleshoot and resolve system issues and to deliver specific information requested by Service Providers. More specifically, our Tier 2 support team helps users with the following:

- Troubleshooting and resolving complex Service Provider connectivity and association issues
- Developing and generating Ad Hoc Reports for Service Providers based on their data requirements
- Automating the generation and delivery of daily Bulk Data Download (BDD) files and Delta BDD files for Service Providers

Our Tier 2 team is available on-call 24x7x365 to ensure timely responses. In addition, our support teams proactively monitor the NPAC system as well as porting activity to ensure optimal performance.

Tier 3 Support

NPAC Help Desk can assign tickets to the NPAC Development team for **Tier 3 Support** to help investigate and verify defects, evaluate the impact severity, and determine the appropriate course of action. Potential actions include:

- Identifying an alternative solution and schedule fix for a future point release;
- Building an emergency patch release containing a code fix; and
- Providing an explanation for system behavior.

Our Tier 3 team is available on-call 24x7x365 to work with the Help Desk and resolve any issues.

Contact List Administration

Neustar maintains several contact lists, shown in Table 1.1-2, which contain Service Provider contact information that can be used as a source directory to verify authorization of company personnel when dealing with a variety of issues, like port-in-error or failure-to-port conditions or when NPAC personnel have to initiate contact with a Service Provider organization to troubleshoot interface or connectivity issues.

Additionally, Service Providers use these lists to contact their counterparts in other companies as needed. Service Providers also have the ability to maintain and update these contact lists on the secure portion of the NPAC website.

Table 1.1-2. Service Provider Contact Lists

List	Description
NPAC Authorization List	Used to validate whether the caller is authorized to contact the Help Desk. These approved personnel can authorize changes to their company's data in the NPAC and can cause billable charges to accrue. When contacting the Help Desk for support, callers are required to provide their company's SPID and authorization PIN number. Callers who cannot provide the correct information are referred to their company's Primary point of contact (PoC). Managing to this list carefully can help with revenue assurance by ensuring billable events are initiated only by authorized Users.
Service Provider Primary Contact List	Individuals within a company authorized to contact the NPAC Help Desk and able to make changes to their company's Authorization List. The Primary Contact also has authorization to execute required documents, such as new User Applications and User Agreements.
Service Provider Secondary Contact List	Individuals within a company authorized to contact the NPAC Help Desk and who can make changes to the company's Authorization List.
Port in Error—Failure to Port Contact List	Individuals within a company able to authorize porting events when a Port-in-Error or Failure-to-Port condition exists. Should one SP encounter porting issues, it can use this contact list to reach out to counterparts to resolve issues and achieve faster resolution time for an end consumer who is affected.
NANC 323 SPID Migration Contact List	Individuals within a company for SPID Migration activities (NANC Change Order 323). SPID Migration POCs are the only authorized company representatives for any issues, requests, confirmations, and commitments with respect to NANC 323 SPID Migration activities.
Service Provider Courtesy Contact List	Key personnel able to troubleshoot interface problems and assist Mechanized customers with resolving Application Interface issues. NPAC personnel initiate contact with a Service Provider when their LSMS or SOA system is not associated with the NPAC.

1.1.4 Provide Industry Training

The LNPA offers classroom training on the use of the NPAC UI (the LTI and to be known as the "NPAC Portal") either on-site at Neustar, off-site at the customer's location, or virtually. This training is shown in Table 1.1-3:

Table 1.1-3. LNP Training Modules

Topic	Description
Using the NPAC/SMS	• Sign on and use the LTI • Navigation—hands-on experience navigating through the LTI • Subscription Management—create, modify, delete and view a subscription version (SV) in the LTI • Reports—create and view a variety of reports available via the LTI, including the LRN report, the NPA Split report, the NPAC Customer Report, the Open NPA-NXX Report, the Subscription Report, Number Pooling Reports and the System Tunables Reports • Audits—create and find audits, learn their use and why they are important • Error Handling—respond to screen errors and obtain support from the NPAC User Support staff • Online Help—navigate the on-line help screens

In compliance with the RFP, formal training will be expanded to include training on:

new

- Uploading ported/pooled TN data and User Data
- Receiving and understanding broadcasts
- Receiving and understanding error/success messages
- Requesting, receiving, and understanding mass changes
- Requesting, receiving, and understanding reports (including billing)
- Understanding security and encryption measures

Further, in the next term, we will offer online training modules via the new NPAC Portal on LNP 101 and on utilizing NPAC functionality.

In addition to continuing to offer in person/class room training, we will provide these training components in a modular format online to allow carrier personnel to learn about LNP and the NPAC at their own convenience and pace.

1.1.5 Support Industry Testing

Testing with the NPAC is critical to ensure Service Provider systems properly interface with the NPAC. Test cases are implemented to ensure new and existing NPAC functionality is not adversely impacted thereby allowing uninterrupted porting. Testing is required whenever new Service Providers join the LNP ecosystem, when a new NPAC software release is implemented, and when the Service Providers or the NPAC modify or upgrade their systems.

Neustar currently offers two test platforms so that Service Providers and their vendors can perform:

- Testing of their systems with the current production NPAC/SMS software release
- Testing of new NPAC/SMS software releases prior to the release being implemented in the NPAC Production Regions

The Test Platforms are available for testing 24x7x365. An Application Engineer is available during normal business hours (Monday – Friday; 9am – 7pm ET) to assist Service Providers and their vendors with their testing needs, for example to perform key exchanges, generate bulk data downloads, administer filter management, create network data, and execute NPAC functionality test cases. In 2012 alone, Neustar's Application Engineers provided over 4,200 hours of testing support in response to requests from Service Providers and their vendors for ad-hoc testing requests, dedicated testing for SOAs and LSMS, etc.

Neustar hosts a monthly Industry Testing Conference Call for Service Providers and vendors as well as a weekly conference call during Certification Turn-up Testing for a new NPAC/SMS software release. These testing conference calls provide an opportunity for Services Providers and vendors to receive information regarding NPAC software releases. The calls provide a forum for questions and concerns that are addressed by our experienced staff of customer support and application engineering personnel.

Types of Testing Neustar Supports:

Table 1.1-4 shows the types of testing vendors and Service Providers perform with the NPAC/SMS Test Platforms:

Table 1.1-4. Types of Testing Supported by Neustar

Testing	Description
Turn-up Testing	Turn-up Testing is comprised of both new functionality test cases, that ensure vendor and Service Provider systems interact properly with the new NPAC/SMS software features, and regression testing to ensure vendor and Service Provider Systems interact properly with existing NPAC/SMS software features. Turn-up certification consists of the following suite of test cases: • New Service Provider Certification Testing: **451 test cases** • Regression and New Feature Testing, Existing Provider Certification Testing : **SOA 121 test cases; LSMS 102 test cases**
Regression Testing	When the NPAC/SMS system changes or when a Vendor's and Service Provider's system changes, Vendors and Service Providers must perform Regression Testing to ensure any changes have not introduced issues that could negatively impact NPAC/SMS performance. • Regression Testing for **SOA - 130 test cases**; **LSMS- 70 test cases**
Unsupported (Ad Hoc) Testing	The NPAC/SMS Industry Test Platform is available for general use by Vendors and Service Providers to perform testing. The Test Platform provides a suitable environment for NPAC Users to perform regression testing of their SOA and LSMS systems with the current NPAC/SMS software release in production, and the new NPAC/SMS software releases prior to the release being implemented in the NPAC production Regions.
Certification Testing Support	Certification Turn-up Testing is performed on a supported basis, i.e. Vendors and Service Providers test one-on-one with an NPAC Test Engineer creating network data for the test cases, executing NPAC functionality test cases, and ensuring the Vendor and Service Provider systems interact properly with the NPAC/SMS.
Acceptance Testing	Neustar performs acceptance testing of all NPAC/SMS software releases, operating system version releases, and hardware configurations prior to deployment in the production NPAC/SMS Regions. Neustar executes NPAC/SMS system acceptance testing on production-like Acceptance Platforms and not in production to verify that changes will not impact production in any manner. Neustar executes comprehensive NPAC functionality testing for new NPAC/SMS software features and Region Readiness Testing for each NPAC/SMS Region. Region Readiness testing entails installing the NPAC/SMS software release, operating system version releases, and hardware configuration changes with a copy of each of the current seven NPAC Region databases, to ensure there are no unexpected outcomes of the NPAC/SMS system running with the current NPAC Region database. Neustar performs key NPAC production processes and procedures such as - nightly House Keeping events, SPID Migrations, Bulk Data Download file (BDD) generation, local application server failover testing, region failover testing from

Testing	Description
	primary Data Center to secondary Data Center, as part of Region Readiness Testing for each NPAC Region. This ensures releases and changes will not adversely impact Service Providers' ability to perform porting activities with the NPAC/SMS system. After all these functionality tests are completed, we perform high speed performance testing on a test bed that matches the production environment exactly to ensure the new configuration(s) (HW and/or SW) can exceed all defined SLR speed/throughput requirements. This testing is vital to ensuring hundreds of different porting transactions and business rules are not negatively impacted and to minimize the risk of any adverse impacts to Service Providers.

The Neustar Difference

Neustar has been providing and supporting the NPAC/SMS Industry Test Platform for 10 years. As shown in Exhibit 1.1-6 the functional knowledge, expertise, and support our engineers provide to Service Providers and their vendors are evident in the Annual NPAC Performance Feedback Survey.

In an effort to better serve our customers we will make available an enhanced testing capability which will allow scripted results and responses. Customers will have the option to use the existing Industry NPAC test beds as well as the enhanced capabilities. The enhanced testing capability will offer:

- **Added flexibility** as service providers can test outside the normal Industry testing windows and configure their own reference data as needed. For example, if a Service Provider is implementing a new billing system, and wants to test NPAC functionality as part regression/progression testing, then it will have the option to use the new testing capability to run specific test cases according to its schedule and business requirements.
- **Enhanced automated testing** so that Service Providers will be able to implement regression testing and new NPAC functionality testing scenarios to generate NPAC/SMS responses and broadcast to test with their "downstream" systems and processes. This will enable Vendors and Service Providers to self-certify Turn-up Testing. NPAC Test Engineers will review Turn-up Testing test case results and logs to confirm that Vendor and Service Provider systems interact successfully with both the NPAC/SMS current and new software releases.

NPAC User Survey
New Services Rollout – NPAC Testing Services

Attribute	2011 Score	2012 Score	Trend
Test Engineer Knowledge	3.7	3.8	▲
Test Engineer Responsiveness	3.7	3.8	▲
Test Engineer Communication Skills	3.7	3.8	▲
Test Engineer Responsiveness to Issues	3.7	3.8	▲
Test Environment Availability for Scheduled Turn-up, Group, and Failover Testing	3.7	3.8	▲
Test Engineer Successfully Managed Testing Time: Turn-up Testing	3.8	3.8	⟷
Test Engineer Successfully Managed Testing Time: Group and Failover Testing	3.7	3.8	▲

>3.4 - Strength | 3.0–3.4 - Currently Acceptable | <3.0 - Needs Improvement

Exhibit 1.1-6: Neustar continues to provide superior testing services to the Industry to ensure all components of the LNP ecosystem interact in a coordinated manner as designed.

1.1.6 Administer the Industry Change Management Process

As the LNPA, Neustar has been responsible for providing the Industry with expert Change Management Administration (CMA) since 1997. This function requires the Neustar team to have a deep understanding of the domain, ask thought-provoking technical and operational questions, have a long historical understanding of previous changes, and properly manage and maintain all inter-related change order documentation via an Industry-approved process (see Exhibit 1.1-7). Neustar views this function not just as an administrative one to manage NPAC/SMS functional and technical changes desired by the LNP Industry, but thoroughly considers the impacts to multiple parties, eventually guiding the change order discussion towards a solution viable for the entire Industry. This need to find the right balance between being proficient (in an administrative capacity) and inappropriately influencing the process (as the SME of all change orders), is an intangible skill that comes only with experience.

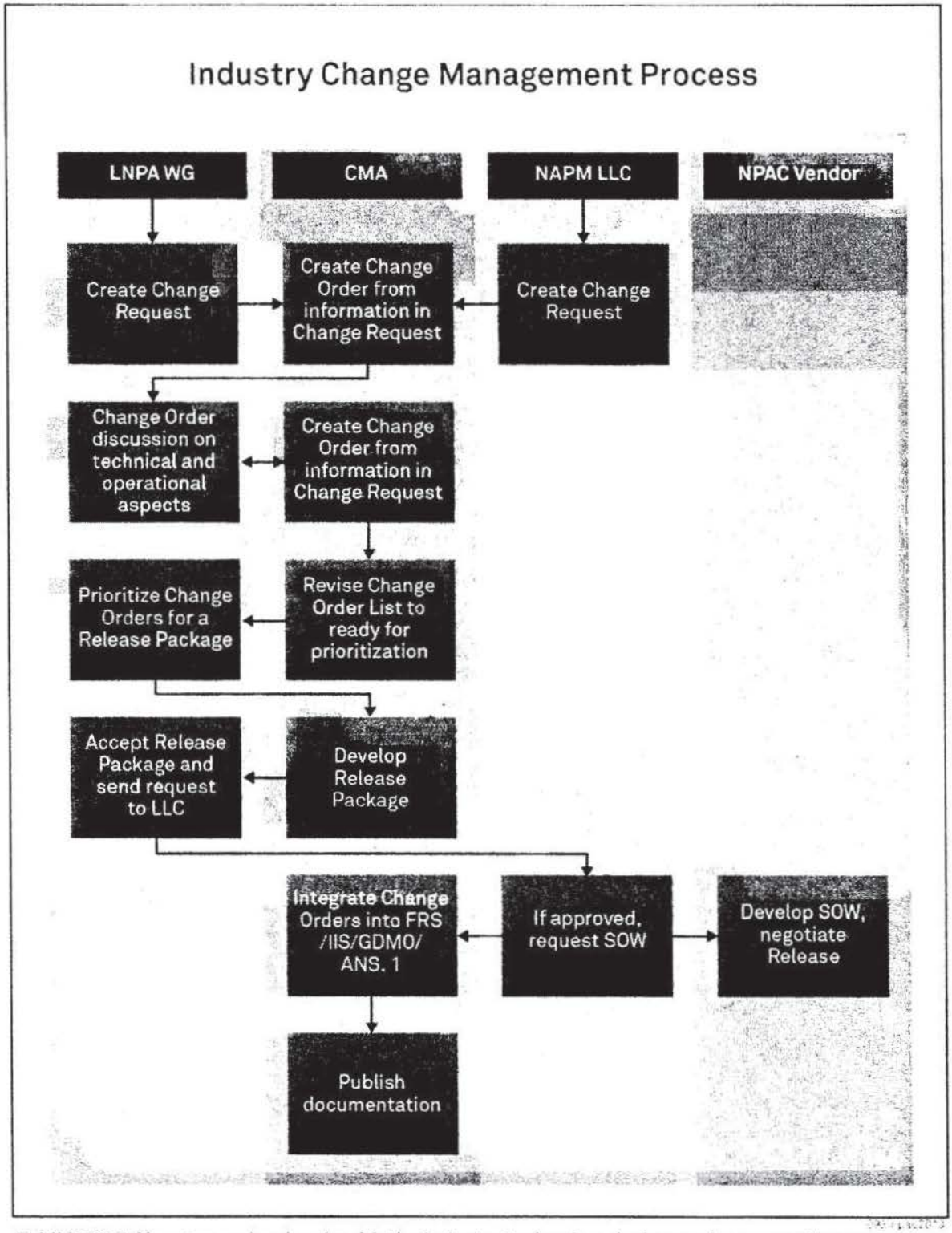


Exhibit 1.1-7: Neustar works closely with the Industry to develop, design, and manage changes to the NPAC/SMS.

From a functional standpoint, Neustar:

- Manages change order documentation, including writing the Business Case Need and High-Level Description of Change, assessing requirements/message impacts (requirements in the FRS, message flows and attributes in the IIS, and message structures in the GDMO, ASN.1, and [redacted]), and tracking and documenting the Industry discussion including Q&A from initial business need through high-level definition, analysis, design, and implementation.

- Coordinates change order prioritization for NPAC SMS Software Release packages in a neutral manner, including a deep-level understanding of the requested functionality in order to thoroughly explain change orders that allow knowledge-based Industry voting, maintain service provider voting guidelines, compile the results of secret voting, and determine Software Release package sizing and package content in order to manage the combination of scope and delivery timeframe.

- Updates Industry documentation, including FRS (narrative description and detailed requirements), IIS (message flow graphics showing message requests/responses and applicable attributes in those messages), GDMO (technical managed object and attribute definitions), ASN.1 (technical message notation and definition), [redacted] (schema definition) and testing documents (full comprehensive and specific release Test Plans and Test Cases).

- Serves as a liaison between the Industry and NPAC Development and Operational Teams, to facilitate Q&A on issues that arise during the analysis and/or design phases.

- Mediates functionality/testing issues between the NPAC Testing Team and SP/Vendor Testing Teams.

The Neustar Difference

As CMA, Neustar has successfully managed 452 NANC change orders and well over **100** Illinois change orders. We have been able to do this because we are:

1. Trusted by the Industry—over the years, we have worked to earn Industry's respect and confidence that we are serving the entire Industry fairly and impartially—critical to the overall efficacy of the CMA role and function.

2. Experienced—In LNP Administration, Industry needs, and possesses a historical knowledge of the first days of number portability in this country. This enables us to answer questions accurately and quickly which results in the Industry being able to make more informed decisions and maximize productivity at working meetings reducing travel expense and realizing improvements to the NPAC service or processes more quickly.

> "As someone who assists the LNPA-WG with the Industry Best Practice Document, I rely on Neustar for assistance..... Neustar, Security-Related Information and Security-Related Information specifically, have been phenomenal people to work with in terms of partnership and customer service. I wish other vendors would learn from Neustar's dedication to customer assistance."
>
> NPAC survey 2008-2009

1.1.7 Validate Information for Law Enforcement Agencies and Telemarketers

The introduction of Number Portability has provided significant benefits to consumers in the form of increased competition, and market efficiency, but also has introduced additional complexities surrounding public policy. By virtue of the ubiquitous nature of phone numbers and the fact that dialed digits no longer can be used to reliably identify a subscriber's service type or provider. Two examples of this impact involve the prohibition on using automatic dialing systems/pre-recorded voices to target wireless consumers and law enforcement's investigative process.

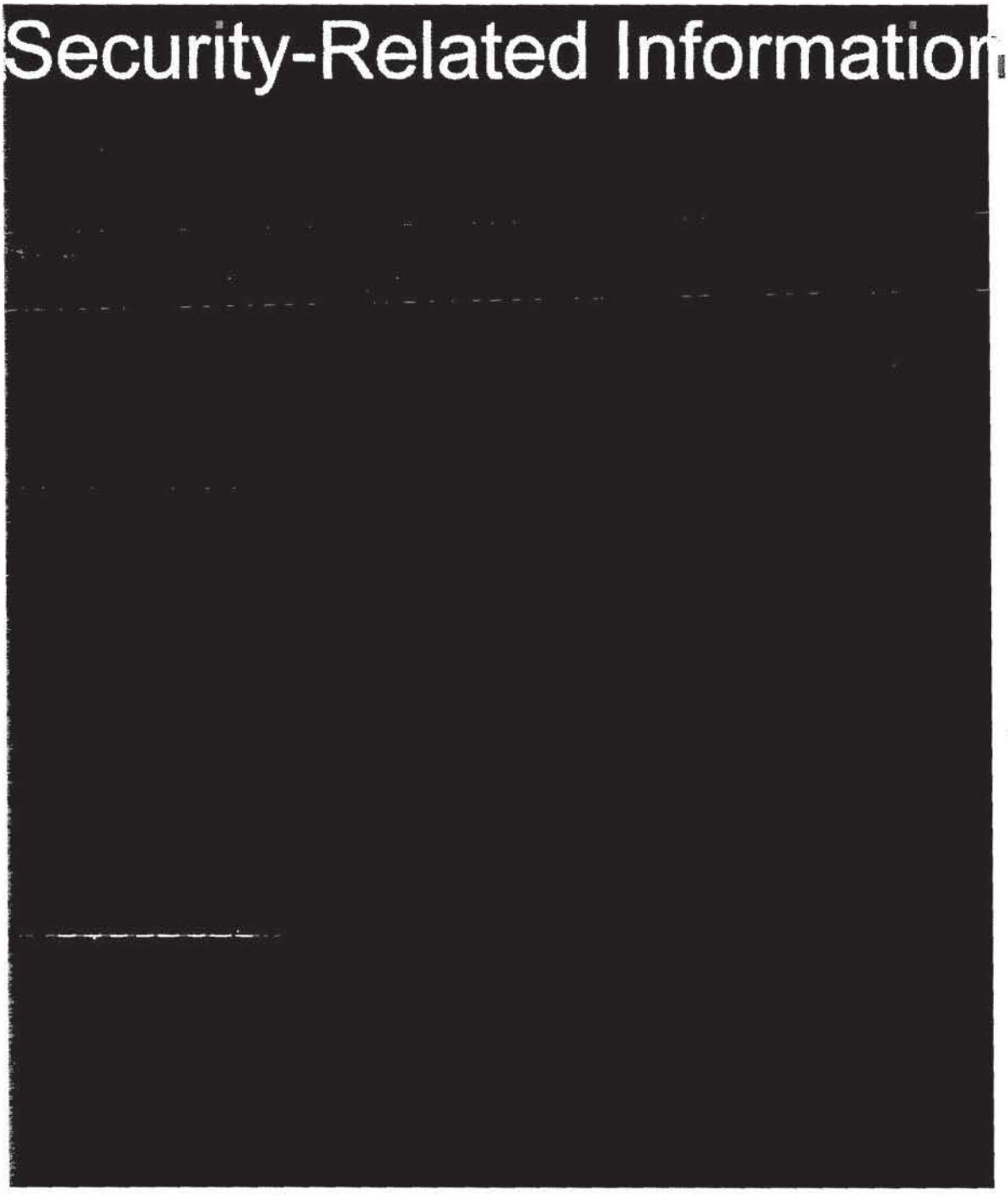
In response to these developments and in partnership with the NAPM LLC, Neustar developed the following applications:

- **Intermodal Ported Telephone Number Identification (IPTN) service**—Inter-modal porting is one of the key benefits offered to U.S. consumers via the NPAC, and millions of subscribers have taken advantage of it. The IPTN service delivers, on a daily basis, a comprehensive file of telephone numbers and telephone number ranges that have transferred from fixed line service providers to wireless ones, and vice versa. This makes it possible for telemarketers and credit/collections agencies to quickly and reliably provision their systems complying with the Telephone Consumer Protections Act (penalties for violations of the TCPA can be over $11,000 per incident).

- **Local Number Portability Enhanced Analytical Platform (LEAP)**—The LEAP service is designed for law enforcement agencies, public safety dispatch personnel, and authorized supporting organizations to facilitate authorized access to portability data in an environment where time is often of the essence. The service operates via both an online web-based GUI and an [redacted] accessed over a virtual private network. It permits qualified customers to submit a telephone number (or a list of up to 100 numbers), and receive a limited subset of NPAC information associated with those numbers—namely the identity and contact information for the controlling network service provider and (if available) for the reseller or alternative service provider. [redacted]

  Today, over 100 qualified customers, at the federal, state, and local levels rely on the LEAP service as the exclusive mechanism to obtain telephone number data.

Both of these applications are designed to make a subset of NPAC data accessible to specific constituencies and for limited and strictly-defined purposes—namely to comply with federal regulations and support the investigative and public safety process. Security-Related Information


Security-Related Information

Operation of these two platforms goes beyond technical administration. In providing these services to these constituencies, Neustar, as the LNPA, acts as a steward and ambassador of the NAPM's objectives and priorities. We do so via the ongoing enforcement of data restrictions on LEAP and IPTN customers, actively ensuring the strict confidentiality of LNP data, and addressing customer questions and concerns regarding functionality and policy. We have cultivated strong relationships with these communities by providing excellent service, being a reliable resource for, and by effectively communicating the requirements of the NAPM LLC with regard to these services. In all the time we have been operating them, there has not been a single complaint raised to the NAPM or the FCC regarding our fairness or our performance. In addition, Neustar has satisfied all internal and customer audits with regard to these services since their inception.

In spring of 2012 Neustar conducted a survey of LEAP customers, and found that 94% of agencies found that the service met or exceeded their expectations. Here's what else some of the customers had to say about LEAP:

> "...allows us to off-load the tedious task of determining ownership in a "porting" world."
>
> "Getting the wrong information about a particular telephone number could hamper or even stop a successful investigation in its tracks."
>
> LEAP Survey 2012

Neustar will continue to work with IPTN and LEAP customers, in partnership with the NAPM LLC, to improve the services. For the next term, we propose:

- A "push" mechanism for IPTN, permitting the system to affirmatively notify customers of intermodal ports when they happen, as opposed to waiting for a file download
- Mobile/Smartphone versions of LEAP to permit remote access for field personnel to augment the capabilities of the NPAC IVR.

1.1.8 Provision LNP Orders

Provisioning LNP orders on behalf of customers in an accurate and secure manner is an important function of the LNPA.

Further, to avoid any negative ramifications of an incorrect porting activity and to assist users to make informed choices, it is important to fully understand the LNP business flows to accurately translate the request. Neustar's team of provisioning experts is responsible for coordinating, managing, and processing requests from Service Providers and the Pooling Administration System (PAS). A focus on automation has meant that our team provisions customer requests with over 99.9% accuracy.

Specifically, the team has and will continue to process the following LNP requests:

- Creates
- Activates
- Modifies
- Deletes
- Mass update / mass port requests
- SPID migration activities
- NPA splits

Pooled Block Management

The purpose of the NPAC Pool Block Process is to receive requests from either the customer or the Pooling Administration System (PAS), validate the same, and then schedule their execution in the NPAC/SMS so as to disseminate network routing and other information on behalf of Neustar customers.

Neustar Users that also utilize PAS may enter the Pool Block requests directly into the PAS or may send their requests to the Neustar provisioning team for processing activations, modifications, or deletions. Information is disseminated in "blocks" of telephone numbers—a series of telephone numbers grouped in thousand-number parcels known as "Pool Blocks." Pool Blocks are identified using the first 7 digits of a 10-digit telephone number—the NPA-NXX-X. A series of 1,000 telephone numbers is assigned sequentially to that block where the last digit in the unique 7-digit sequence is the 1st number of the 1,000 telephone number sequence, i.e., NPA-NXX-X000 to NPA-NXX-X999. Changes to the Pool Blocks (activations, deletions, modifications) are distributed simultaneously to LSMS operators in a specific U.S. Region to update their systems with the new Pool Block arrangements.

Neustar's provisioning team works very closely with the Pooling Administrator and NANPA to help customers work and resolve complex Pooling request and provisioning issues. As the LNPA, PA, and NANPA, Neustar is well-versed in the rules and applicability of the same and manages this process on behalf of our customers in an effective and efficient manner. For example, our dedicated team of experts understands that the NPAC should accept requests only from a provider for block creation and activation when the requesting SPID is the code holder. In cases where the requested block is for an NPA-NXX that is not yet opened in the NPAC, or where the referenced LRN does not yet exist, our team knows to monitor the situation on a daily basis and wait for the necessary objects to be created in the NPAC without rushing to complete a job assigned.

As numbers are ported, some fail to flow through the automated process. These are known as fallout and can negatively impact Service Provider costs by increasing the time it takes to port and adds to customer acquisition time and costs. Neustar works with Service Providers to get fallout corrected and processed as needed, to avoid occurrences where a Service Provider is updating PAS with information that is not needed or already is populated in the NPAC. Due to the diligence of our teams, less than 0.1% of pooled block requests are rejected by PAS—i.e. fallout is minimized. We take these lessons learned and work with the PA to add checks and balances to their processes or systems to prevent reoccurrence in the future.

Mass Updates/Mass Ports

Mass Updates/Mass Ports are necessary when the attributes (for example, LRNs and DPC/SSNs) associated with a large number of telephone number-level records must be updated at the request of a Service Provider.

While the functional requirements refer only to updating fields in existing SVs or blocks, the provisioning team offers a full-featured batching and scheduling system that addresses all types of LNP porting activities—create, release, cancel, activate, modify, disconnect, dash-X creation, block activation, block modification, and block deletes.

An important part of Mass Updates/Mass Port is notification suppression to manage capacity and volume. Notifications generated are scenario specific and can be complicated. Often, a User's SOA system does not need to receive all of the notifications that result from a particular project. On the other hand, missing important notifications can result in operational problems for connected systems. Neustar provides dedicated personnel to deal with these types of operations and guide the customer through the process of defining the proper configuration of notification suppression as well as with retrieving missed notifications.

> "The Mass Change, Mass Update team including Security-Related Information , are the main people that I deal with on a daily basis. They are FANTASTIC, they respond quickly, they always get whatever is asked of them done very quickly. I couldn't be happier to be dealing with them on a daily basis. Thank you for all you do!"
>
> NPAC Survey 2011

SPID Migrations

A SPID Migration is a coordinated update of the SPID associated with NPAC/SMS network and telephone number-level data and is required, for example, when an existing NPA-NXX code is reassigned to another Service Provider. Data potentially impacted by a SPID migration includes network data—codes (NPA-NXXs), pooled blocks (NPA-NXX-Xs), and LRNs—and telephone number-level data—(active) Subscription Versions—for telephone numbers drawn from those codes and pooled blocks and using those LRNs. However, SPID migration changes only the SPID associated with NPAC data; no other attributes associated with the telephone number-level records (Subscription Versions or SVs) are changed by the SPID migration process.

SPID Migrations can be scheduled and processed either online or offline. A SPID Migration that involves a change in a code only (NPA-NXX) is processed by the NPAC and the code change is broadcast to LSMSs and SOAs that have chosen to opt-in to the online SPID Migrations. A SPID Migration that involves pooled blocks (NPA-NXX-Xs), LRNs, and active telephone number-level data is processed independently by each LSMS operator and by the NPAC without broadcasting the changes to the LSMS operators.

To facilitate SPID migration activity, Neustar coordinates the SPID migration request details with Service Providers involved in the migration and then provides pertinent information to the Industry via prompt notifications as well as by maintaining and publishing a calendar of planned migrations. The system enforces Industry-determined limits on the quantity of migrations in a single region and nationally so as to not over-burden downstream systems. On the night before each migration is scheduled to occur, NPAC personnel initiate cancellation of pending SVs that otherwise would prevent the migration. At the start of the NPAC scheduled maintenance window, the NPAC Operations Team

generates the final Selection Input Criteria—SPID Migration Update Request Files (SIC-SMURF files) for the scheduled SPID Migrations and places the SIC-SMURF files in the Providers' FTP directories. An SP that is not performing an online SPID migration uses the final SIC-SMURF files to independently perform the SPID Migration process on their systems. For offline migration activity, our provisioning team also uses the final SIC-SMURF files to process the scheduled SPID Migrations in the NPAC/SMS system.

NPA Splits

In the event an NPA split occurs, the NPAC provides an e-mail notification to NPAC Users announcing the impending split. Well before the Permissive Dialing is scheduled to begin, the NPAC/SMS broadcasts all codes involved with the split with their new NPAs. When Permissive Dialing begins, callers can start using either the old or the new area code for their calls to numbers in the affected NPA-NXXs. During the Permissive Dialing Period, the Industry modifies the NPAC records for numbers affected by the split, replacing LRNs containing the old NPA with LRNs that remain valid after the split. As the number records are modified with the new LRNs, the modified records are broadcast to all LSMS operators. At the end of the Permissive Dialing Period, the NPAC broadcasts a delete of the old-NPA versions of all the codes involved in the split.

1.1.9 Provide Interactive Voice Response (IVR) Services

The NPAC Interactive Voice Response (IVR) System provides Service Providers and Law Enforcement Agencies the carrier contact name and phone number for ported and pooled TNs in the NPAC/SMS. The IVR System, active in both the primary Data Center and secondary Data Center, is available 24x7x365. Service Providers and Law Enforcement Agencies can access the IVR via a toll free phone number. Security-Related Information

The NPAC Customer Experience team is instrumental in working with Service Providers during the registration process to obtain valid company contact information used within the NPAC Automated Telephone Number Look-up System. Once the information is provided, it is then loaded to the NPAC IVR system. Law Enforcement Agencies, Public Safety Answering Point Providers, and Service Providers must first register with the NPAC Help Desk to obtain access to the IVR system. Security-Related Information

Security-Related Information

- **Law Enforcement Agencies**—agencies in the United States or of a State or political subdivision thereof that are empowered by law to conduct investigations of or to make arrests for violations of federal, state, or local laws; and
- **Public Safety Answering Point Providers**—entities in the U.S. that perform Public Safety Answering Point (PSAP) functions in the performance of their official duties.

Neustar's IVR system has consistently delivered—handling over 50,000 calls per month (on average) while maintaining well above the 99.9% availability requirement. Neustar has refreshed the IVR's hardware and software platform [redacted] to ensure we continue to meet and exceed Industry expectations.

We will implement new Interactive Voice Response functionality that will provide a response for non-ported and non-pooled TN's similar to what the LEAP solution currently provides. Our extensive experience with the current IVR and LEAP solutions will allow for a seamless design, build, and deployment of the next generation IVR system. The new IVR solution will provide the same great service expected by the Industry with accurate and efficient IVR responses.

new

Security-Related Information

1.1.10 Manage Billing and Collections

Neustar has the most extensive Number Portability billing experience in the world. Neustar has provided Number Portability for U.S. and Canadian carriers since 1998. Given this vast experience, no other bidder can match our ability to capture, compile, calculate, reconcile, and invoice hundreds of millions of Number Portability transactions to literally thousands of carrier accounts.

Our customers have instituted very strict requirements to meet billing accuracy and timeliness metrics. Our billing service is regularly audited under the Gateway Evaluation Process (GEP) and we have successfully met all accuracy and timeliness requirements. Neustar's team of billing experts is well-versed in all things related to billing for LNP services and provides timely responses to questions from customers on pricing, collections, receivables, etc. Additionally, Neustar conducts a monthly conference call with Users to review the past month's invoices, monthly transaction variances, porting volume trends, and other billing issues. Our premier billing solutions meet the needs and the requirements of the Industry.

Neustar provides several ways for payment processing, invoice viewing, and general account management. The solution is fully compliant with the entire list of key billing functions outlined in the RFP and also supports certain administrative functions. LNP transactions are easily differentiated from direct charges. In addition, Neustar provides summary billing information to the NAPM LLC and it's designates through the issuance of monthly reports. Service Providers are able to access their Number Portability account online using a Web interface to the billing system to obtain detailed and accurate billing information. It should be noted that, for security reasons, only certain authorized personnel within Neustar have access to the Billing System or any of its component databases.

n

Neustar has customized its billing software to align with the complexities of the U.S. LNP contract—no existing out-of-the-box billing solution would accommodate the involved pricing structures. Our billing personnel manage the following system capabilities on a daily basis, specifically, our NPAC Billing System can:

- Compile porting transaction usage on a per Service Provider basis
- Compile porting transaction usage on an allocated model per Service Provider
- Generate usage measurements on the number of ported records for each Service Provider and collectively for all Service Providers
- Generate measurements of messages processed by type
- Produce detailed reports for Service Providers on a scheduled and ad hoc basis

- Create a full billing report of all billable porting transactions, along with any non-porting related fees
- Render Service Provider invoices
- Monitor and record amounts paid, amounts open, amounts pending, and amounts in litigation by Service Provider

The Billing Accuracy and Timeliness requirements of the contract allow no room for error. In response, not only do we have a robust service, but we also have developed strong relationships with our vendors to align with guidelines in mailing timeliness. Neustar will offer customers the option to opt-in to receiving e-invoices in lieu of paper invoices in response to customer inquiries and to reinforce our commitment to environmental preservation. We will work with the NAPM LLC to determine any impacts to the GEP as a result of this service offering. Also billing will be included as a module within the new NPAC Portal with additional functionalities designed jointly with the Industry. new

Neustar is ISO and SOX compliant. Our billing team continuously focuses on process improvements and routinely looks for opportunities to automate to address the complex contractual requirements outlined in our contract. Neustar has consistently and effectively managed and met all GEP metrics target over the last five years.

1.1.11 Industry Reporting

The LNPA issues a variety of reports to support the NAPM LLC's administration of the LNP contract. In addition to system-generated reports that Users of the NPAC can request via the NPAC User Interface, Neustar issues various reports to the NAPM LLC on performance, new NPAC customers, porting and pooling activity, summaries of regional billing data, and also assists with ad-hoc requests for reports such as NPAC record growth each week or the billable transactions data broken into p-LRN versus conventional LRN transactions. There are also audit reports, such as:

- Neutrality audit reports issued by both E&Y and Piper Rudnik
- GEP Audit reports
- IPTN and LEAP customer and associated revenue audit reports
- Annual Data Center audit reports

Neustar will continue to provide all existing reports to the NAPM LLC, LNPA, and FCC. These reports are critical to both carriers and Industry bodies responsible for monitoring and managing NPAC activities. The accuracy and timeliness of these reports will continue to be our priority.

In addition to meeting the current distribution requirements for the reports, we will publish a performance dashboard on the secure portion of the NPAC website which will serve as a place for authorized users of the NPAC, LLC members, and designated IT Operations personnel to obtain up-to-date, near real-time information on performance metrics. As shown in Exhibit 1.1-9, this dashboard will also provide a window into the health and performance of the entire LNP ecosystem, including the NPAC and connected LSMSs and SOAs. Information will be published at a regional level and will not display any proprietary, SPID-specific information. new

A sample listing of the metrics available via this new dashboard:

- Real-time NPAC SLR performance
- Industry partial failure counts
- NPAC inbound queues
- SOA/LSMS outbound queues

The dashboard will consist of several processes, each working in concert to allow for monitoring, alarming, and reporting. This near real-time dashboard will depict the speed with which the NPAC processes transactions, including those generated by Mass Porting projects. The dashboard will allow customers to understand the relationship between their SOA/LSMS performance relative to the NPAC and will depict performance of an entire NPAC region, information that can be used prior to performing technology migrations or new product launches.

1.1.12 Monitor the Ecosystem—Service Management

As the LNPA, we keep a watchful eye on the entire numbering ecosystem to not only protect the NPAC environment but also to help Service Providers identify issues with their LSMSs or SOAs before these become problems. Neustar personnel are responsible for providing the following services:

Coordination of Annual NPAC Failover Exercise

Given the criticality of NPAC services to Service Providers as well as to help prepare for disaster situations, it is important to ensure that the NPAC is always available and operating in an efficient manner. In order to ensure Business Continuity and to demonstrate and verify that the NPAC can fail-over smoothly to the backup data center, Neustar performs a fail-over exercise [redacted]. The exercise also includes pre and post-failover consultation with NPAC Users. The Annual Failover exercise Security-Related Information [redacted]. Neustar personnel work with NPAC customers that experience difficulty performing fail-over functions and assist with trouble shooting and analysis. We work jointly with the Users to define solutions for ensuring their systems will seamlessly connect to the backup site should the need arise. Neustar reviews results of the failover exercise with the NAPM LLC to keep them apprised of any issues faced and corrective actions being pursued with customers.

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Real Intelligence. Better Decisions.

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Security-Related Information

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System Outages, Notifications, and Root Cause Analyses

In rare cases when the NPAC system does experience an unplanned outage, Neustar quickly engages the Industry with timely notifications of outages and meaningful updates as new information becomes available. Later, formal root cause analyses and corrective action plans are provided.

Specifically, when unplanned outages occur, NPAC customers want and get from Neustar the following:

- To be notified promptly upon detection of an outage event. It is critical to ensure system service unavailability (outage) notifications are sent to NPAC Users with meaningful information that can provide insight into the situation to assist SPs with assessing impacts to them.
- To be provided with RCAs in a timely manner. At a minimum the RCA report should provide the definitive root cause for the event, SLR impacts, customer impacts, sequence of events, and immediate and long-term corrective action plans.

Neustar understands this and uses the following system outage notifications and root cause analysis processes:

1. The Neustar NPAC team sends an "outage" notification to NPAC customers Security-Related Information of an identified system outage. Over the years we have refined and tailored the User notification process to specific User types impacted. For example, if the LTI in a region is experiencing a problem, then the notification is sent only to the LTI distribution list in that region. If the outage/issue is more widespread, affecting both mechanized and LTI Users and multiple regions, then a notification is sent to each affected region and User type distribution list. This tailored approach ensures NPAC Users know that any communication they receive from the NPAC outages team has meaning to them; that they should pay attention.
2. The Neustar NPAC team sends an "outage update" notification regarding an outage/issue Security-Related Information of the initial notification. Additional update notifications, Security-Related Information, are sent while the outage is ongoing. An estimate of system restoral time is included in the update notifications where possible.
3. The Neustar NPAC team sends an "outage restored" notification immediately to the NPAC Users once both customer experience and technical staff determine the outage condition is resolved.
4. The Neustar NPAC team sends a Preliminary Root Cause Analysis (RCA) to Industry Project Executives (PE) Security-Related Information of the detection of the outage. The Preliminary RCA provides the best determination, at that point in time, as to the root cause of the outage, reasons/justification for determining the root cause, and a brief description of the techniques and practices actually used to make the determination. Table 1.1-5 describes the RCA reports provided by Neustar, the deadline, and their content.

Table 1.1-5. Root Cause Analysis Reports Provided by Neustar

Report Required	Report Deadline	Content
Preliminary Root Cause Analysis Report.	following the detection of the Outage	Best determination at that point in time of the root cause for the Outage, reasons/justification for that root cause, and a brief description of the techniques and practices actually used to make the determination.
Definitive Root Cause Analysis Report	Security-Related Information following the Preliminary Root Cause Analysis Report or following Outage detection (whichever comes first)	Includes: • The definitive root cause for the outage and, if it's different from previous root cause reports, an explanation for the difference • Our best determination of the root cause, including a description of why this is not the definitive root cause and a summary of steps used to continue investigation • Reasons/justification for that root cause finding and a brief description of the techniques and practices actually used to make the determination.
Root Cause Follow-up Reports & Root Cause Termination Report	Security-Related Information following the date the Definitive Root Cause Analysis Report (even if it wasn't issued) Security-Related Information following the date the first Definitive Root Cause Analysis Follow-up Report should have been issued (even if not issued)	Follow-up Reports do not need to be done if either Neustar prepares and issue a Definitive Root Cause Analysis Report as above or a Root Cause Analysis Termination Report stating that we are unable to determine the root cause for the Outage, that we have exhausted all acceptable techniques and practices for determining the definitive root cause, that the corrective action will prevent a reoccurrence of the Outage even without definitively determining the root cause, and reasons the corrective action plan will prevent a reoccurrence of the outage.
Corrective Action Plan	Security-Related Information after the Preliminary Root Cause Analysis Report (even if not issued) or the Definitive Root Cause Analysis Report	A summary of the corrective action to be taken to avoid a recurrence of the outage based on the root cause (even if preliminary), justification for the action, and the schedule for implementation of the corrective action to avoid a reoccurrence of an Outage, including "work around" plans.

The Neustar Difference

Neustar's response to outages is a joint collaboration between the customer experience staff and the technical staff which immediately mobilize to resolve any potential service-impacting event. In addition, Neustar's customer support staff has years of system and service knowledge that allows them to effectively communicate technical issues with the Industry and to clearly articulate the problem and any necessary resolution.

Industry Notifications

The LNPA issues many e-mail notifications, some to individual Users, others to all LNPA customers in one or more regions. At the individual level, the LNPA communicates with applicants to become Users through the NPAC registration and certification testing process. Routine notices involve such announcements as:

- Content of an impending release
- Schedules for certification testing of new releases
- SPID Migration schedules
- Time shifts due to daylight savings
- Planned maintenance in the test bed

Spontaneous e-mail notifications occur during a service interruption to explain what has occurred and to provide periodic updates (the RCA process). Another event that triggers unscheduled notices is an LSMS going off-line, causing many partial failures in a short period.

Neustar ensures important and helpful information is provided to NPAC customers in a timely manner. Industry notifications are sent to all NPAC Users that elect to add their company's contact information to various NPAC notification lists. Users have the ability to receive both e-mail and SMS messages.

1.1.13 LNPA Knowledgebase

Neustar staff has unrivalled Number Portability expertise, having successfully designed, developed, implemented, operated, and upgraded the U.S. NPAC/SMS, seamlessly managing the implementation of multiple software releases and upgrades, technology refreshes, hardware augmentations and upgrades. Neustar has successfully grown a very complex, mission-critical system from a scale of handling 1 million transactions in our first year of operations to handling over 500 million transactions in 2012—all while satisfying the changing needs of the Industry and addressing ever-evolving regulations.

Neustar's team supporting the NPAC has been a part of portability since the beginning—either as an Industry or vendor participant. Neustar actively participates in numerous Industry organizations, including:

- Ordering and Billing Forum (OBF) Wireless Committee Chair and OBF Intermodal Subcommittee
- Alliance for Telecommunications Industry Solutions (ATIS), including the Industry Numbering Committee (INC)
- Communication Technology Industry Association (CTIA)
- Local Number Portability Administration Working Group (LNPA WG)

Neustar's pool of telecom, numbering, and number portability experts assist NPAC customers in a wide range of ways ranging from:

- Participating in their LNP system trouble shooting
- Assisting with drafting Industry documents about LNP issues or proposals for new NPAC/SMS functionality
- Answering questions about LNP in general
- Training customers about inter-carrier communication processes
- Validating information, for example, limits on cross-boundary porting
- Addressing specific NPAC/SMS functionality
- Acting as an Industry resource about anything involving LNP or numbering

Our participation at these Industry forums means that we can provide accurate answers to questions being raised by the Industry in real-time to facilitate productive and informative meetings.

Further, Neustar provides a comprehensive website for NPAC-related topics and maintains the official website of the LNPA-WG. Our NPAC.com site offers information on change orders and FRS/IIS documentation for each NPAC release, the official LNP process flows, and general information about LNP. The secure portion of the site, which is available only to authorized Users, offers a plethora of information such as reports summarizing NPAC network data, monthly transaction volumes, Industry M&Ps, and a two-year forecast of LSMS record storage requirements.

Since 1997, our personnel have actively participated in every meeting of the LNPA WG (and its Technical & Operations committee predecessor). We provide the LNPA WG with a resource pool of unmatched number portability expertise. Knowledgeable Neustar personnel participate in every meeting to provide answers to questions as they occur during the working group's technical discussions. We perform the LNPA WG's Change Management function and support the LNPA WG's website. Besides our active meeting participation in the LNPA WG and its subcommittees, we also provide off-line support to LNPA WG participants attempting to prepare descriptions of LNP problems and proposed solutions (PIMs) and proposals for new NPAC/SMS functionality (change orders) for eventual submission to the LNPA WG for consideration.

> We were given the responsibility of porting with very little knowledge of how it works. Over the last 5-6 years Neustar has taught me everything there is to know about SOA & porting. They are always so willing to help.
>
> NPAC Survey 2008

1.1.14 Assist with Disaster Preparedness

Neustar understands number portability is more than just the ability for customers to keep a specific phone number when switching Service Providers. Our personnel have gained unmatched numbering experience which allows us to recognize that number portability is an invaluable tool to assist carriers, state regulators, and the FCC with emergency and disaster preparedness by allowing changes to phone numbers from physical addresses to virtual addresses so phone numbers are no longer physically associated with a switch. These changes are immediately and simultaneously reported to all telecommunications Service Providers throughout the country, so that all service providers always have the same critical information for routing calls. With this in mind, Neustar makes available a staff of experts that work with Service Providers on a regular basis to provide emergency preparedness services to minimize disruption or damage to the communications infrastructure in the wake of events like hurricanes, earthquakes, attacks etc.

Specifically, as shown in Exhibit 1.1-10 we send our notifications to Service Providers throughout the United States describing the services we can provide in the event of a disaster and how to request the same. We also update carriers on status of proactive NPAC outreach activities including LATA ID edit suspension and discussion with FCC on Portability Waivers etc. Additionally, we manage Mass Modification and Pooling Activation efforts between the affected Service Providers during and after the initial disasters.

Copies of our memos are also placed on our Web site, and Neustar personnel offer to contact State regulators on behalf of Service Providers to hasten any approvals needed.

In unforeseen cases of disaster, Neustar works with the Industry and governments to develop solutions where the NPAC can be used to restore communications to the affected area as quickly as possible. For example, as shown in Exhibit 1.1-11 below, immediately after the attacks on September 11, 2001, there were many unknowns. For Neustar, what was known was that the destruction of the World Trade Center towers would severely affect the telecommunications Industry. Neustar consulted with communications service providers and federal and state regulators and contacted the FCC for permission to provide emergency services in a manner that fell outside of porting and pooling guidelines. As requests were received, local number portability was used to port telephone numbers from the affected switches to working switches, and pooling functionality was utilized to port blocks of 1,000 numbers in the same manner. As a result, calls to and from Manhattan could be completed by routing them through switches physically located in Brooklyn, Staten Island, and New Jersey.

We supplement our User Support team with subject matter experts that can assist with questions on how number portability can help with service restorations. Neustar can also provide assistance in seeking the necessary approvals from state public utility commissions and the FCC to initiate any special porting activities outside prescribed geographic boundaries. As the one administrator that provides NANPA, PA, and LNP services, Neustar understands the linkages and has the necessary experience to develop a comprehensive solution in the event of a disaster and to take immediate action.

Service Restoration Using NPAC

From: Security-Related Information

Sent: Monday, October 29, 2012 3:01 PM

To: Security-Related Information

Subject: [illegible]

Service Providers:

Number portability was employed by several carriers to restore emergency telecommunications services in the wake of the destruction caused by Hurricane Katrina. With Hurricane Sandy coming up the East Coast, we would like to remind you that NPAC staff are available to you as a resource, should one or more of your facilities or central offices experience a major outage.

For the next few days, Neustar is supplementing our help desk with subject matter experts who can assist you in restoring service to your customers using number portability. If necessary, Neustar can also provide assistance in seeking the necessary approvals from state public utility commissions and the FCC to initiate any special porting activities outside prescribed geographic boundaries.

If you have any questions or require assistance, please call our NPAC Help Desk at 1-888-NPAC-HELP. The NPAC Help Desk is staffed from 8 AM ET to 8 PM ET Monday - Friday. For after-hours support (including holidays and weekends) simply follow the voice prompts to page a help desk representative, who will return your call within 30 minutes.

Thank you,

SECURITY-RELATED INFORMATION

Reduce yo[illegible]otprint. Print only if necessary.

Exhibit 1.1-10: **Neustar personnel proactively reach out to the Industry to advise them of NPAC utilization in disaster recovery situations.**

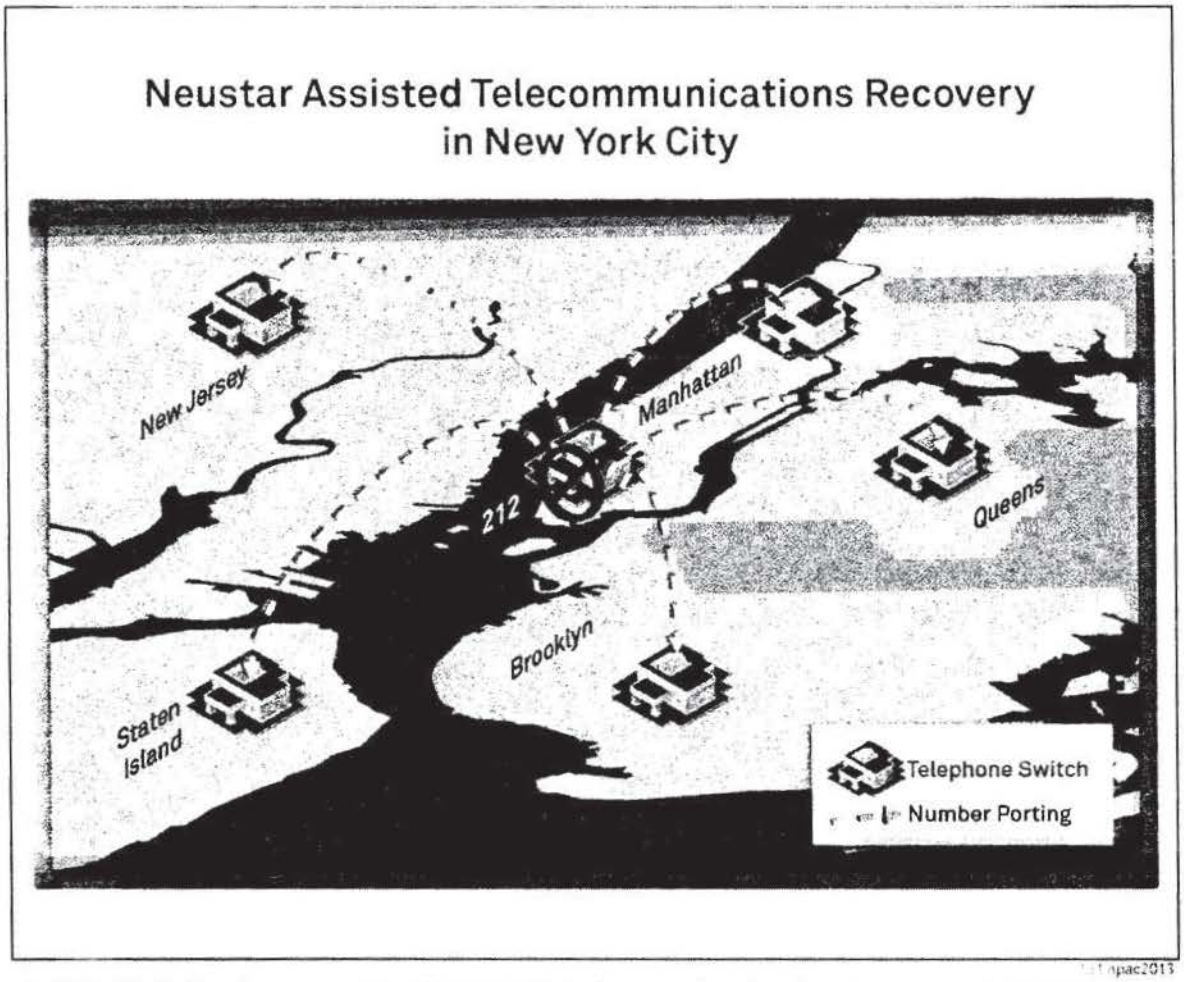

Exhibit 1.1-11: Number portability allowed calls to be completed and service to be restored by porting numbers from affected switches to working switches outside of lower Manhattan.

Neustar's LNPA Services Summary

SPs rely on the NPAC to be highly available and operate at peak performance. This has broad implications for end users of SP services as well as state and federal regulators. As the LNPA, Neustar's philosophy has been to anticipate the needs of an evolving market place and continuously originate novel solutions to address the same while never losing sight of the need to securely and reliably handle various activities on behalf of the Industry.

A recently concluded Benchmark conducted by an independent third-party auditor focused on a review of the current NPAC SLRs, contrasting these requirements against six benchmark participants and Industry Best Practices (ITSM ITIL and CobiT standards). In what we consider proof positive of our stellar service offering, the auditor found that:

> "...Neustar SLR's met and in many cases exceeded what is typically found when compared with external companies having a similar infrastructure and offering similar services. Our comparison with available Industry data also found this to be true. Performance against the SLRs was also found to meet and exceed Best Practice."
>
> 2012 Benchmark

1.2 NPAC/SMS Overview

Why Neustar

- Over 15 years of experience architecting, developing, maintaining, and improving the NPAC/SMS to provide the highest quality of service to the Industry
- Five-Layer custom-built NPAC/SMS architecture with focused expertise at each Layer, as well as a cross-functional approach to deliver the highest levels of availability, scalability, reliability, and performance

Security-Related Information

- Highly redundant architecture for all Layers designed to increase availability of the NPAC/SMS

Security-Related Information

- Separate Database for reporting to ensure the live NPAC/SMS is not impacted by offline queries and reports
- Preserve and maintain the integrity of over 1000 business rules in a constantly changing environment

New for the Next Term

- All required enhancements listed in RFP Section 7.1
- Sufficient flexibility to include all future considerations listed in RFP Section 7.2
- Further automation to guarantee 99.99% high-availability NPAC/SMS architecture
- New NPAC Portal to deliver a seamless and fully functional user experience across all NPAC services
- Additional connectivity options including Ethernet for greater choice

> TMNG finds the overall NPAC operating environment to be consistently stable, robust, scalable/expandable, and well managed...
>
> TMNG—2012 Article 14 audit

The NPAC/SMS platform operates on a custom-built 5-Layer service architecture, uniquely tailored to meet and exceed the U.S. Industry's functional specifications, interface requirements, and service level requirements. As a critical element of every Service Provider's network and subscriber operations, the NPAC/SMS must perform to the highest levels of availability, must be able to support high and varying levels of demand, must be scalable over time, and must be flexible and modular enough to accommodate new requirements without disruption.

Proposal Section 1.2, NPAC/SMS Overview, describes the elements of the NPAC/SMS's technical design, and the manner in which Neustar's uniquely designed operation provides the Industry with the highest levels of functionality, reliability, and performance. Exhibit 1.2-1 demonstrates our performance in 2012. Neustar's commitment to pristine operations and design pre-dates the current RFP; exceeding SLRs and customer expectations has been ingrained in our culture over the last 15 years, and has resulted in several aspects of the NPAC/SMS that go well above and beyond Industry requirements. For example, Neustar has developed customized NPAC/SMS monitoring tools to evaluate the health and performance of the 5-Layer architecture, and pro-actively identify any issues before they become visible to service providers. Security-Related Information

This function is not required under the FRS and was developed proactively by Neustar. Security-Related Information

These are just a few of the Neustar custom-built tools and procedures that are essential to the NPAC's operation, and which a new vendor would have to pick up on the job.

Neustar has successfully met or exceeded the requirements for 11,333 out of 11,340 NPAC/SMS service level measurements over the last five years. In addition, our data center, network, and storage systems are consistently rated as exceeding Industry best practices by independent third parties. Neustar's proposal for the next term includes building upon this performance—plus continued investment into the NPAC/SMS architecture, regular technology refreshes, and process refinements to continue raising the bar.

Proven Design and Development Principles

One way to deliver an NPAC/SMS would be to outsource the deployment or operation of the platform to a third party, with the prime LNPA focused primarily on system design, implementation, and interaction with Service Providers. A vendor taking this approach would be conceding that its strengths do not lie in high performing data center operations, signifying a need to separate the key functions of the LNPA amongst multiple suppliers. Given the unique nature of the LNPA service, however—specifically the wide variety of constituents for whom responsiveness and technical knowledge is essential—the coordination and collaboration between the product team that works with the Industry to design and develop the solutions, the engineering staff that implements the solutions, and the operations staff that maintains it, is a vital ingredient for success. Any miscommunication in this chain can result in delivery of a solution that does not meet the needs of the Industry and could delay fulfillment of any number of requirements. Any changes in the delivered solution as a result of hand-offs between the LNPA and its vendors will generate further chaos and finger-pointing, potentially resulting in further delays and impacts to Service Providers.

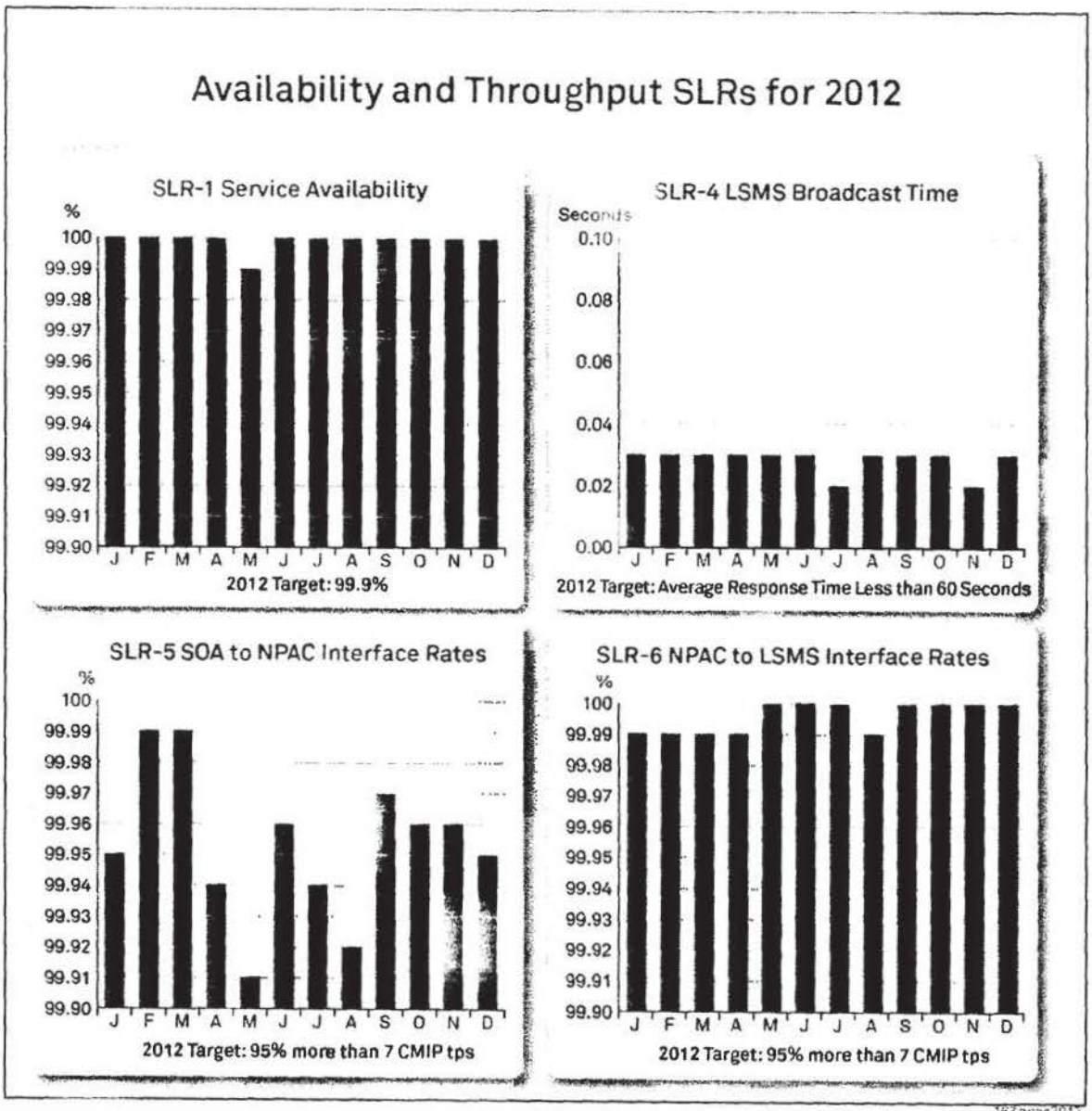

Exhibit 1.2-1: **Neustar's unique operations provide the Industry with the highest level of service.**

When operations are outsourced, there are always disconnects between the entity that engineered the solution and the entity operating it, increasing the likelihood for bugs and service degradations.

The concentration of design, engineering, and operations within a single entity is the best way to ensure high levels of performance—Neustar's experience proves this. Neustar utilizes a prevailing DevOps software development methodology (also called "agile operations") that stresses communication, collaboration and integration between Development, QA and Operations. It has been shown to be more responsive to requested changes and

enhancements and better able to deliver superior services, reliability, and availability. DevOps targets software delivery, quality testing, feature development and maintenance releases in order to improve reliability and security as well as create faster, more reliable development and deployment cycles. As business and development teams need more agility, a fundamental reorientation is needed to provide systems infrastructure in an effective manner. DevOps has been successfully implemented within the NPAC technology teams and has proven to be a valuable model with significant benefits to customers.

If another Respondent plans to rely on Neustar's application software to build an NPAC/SMS solution, it will not be able to simply recompile the code in a new data center and meet the Industry's needs—the RFP has increased performance requirements in several arenas, many of which will require updates to the existing NPAC/SMS software. Not only would the Respondent have to modify application software that was developed by Neustar and is unfamiliar to their engineers, it also would have to integrate that application software into a fully-functional service operation—including data centers, routers, switches, firewalls, security systems, databases, storage systems, and countless other elements of the total solution. Finally that Respondent would need to re-create the operational processes and procedures that enable Neustar to operate at such a high level of service quality today.

Security-Related Information

Security-Related Information

New for the Next Term

During our tenure as the LNPA we have, in partnership with the Industry, evaluated 452 NANC and over 100 Illinois change orders, and deployed 380 change orders over 11 major software releases and countless point releases. Neustar has proven its ability to seamlessly enhance the NPAC/SMS platform with new service provider requirements without disruption or loss of backward compatibility. For the next term, Neustar offers the following enhancements and future considerations, which are further described in Proposal Section 1.2, System Functionality:

All enhancements required by the NPAC/SMS RFP are included in Neustar's proposal:

1. **Alternative interface**—Neustar is currently in the process of developing an Security-Related Information, in accordance with NANC Change Order 372, which will provide Service Providers a flexible and secure alternative to the existing CMIP interface.

2. **Support of IPv6**—Neustar is currently in the process of developing a plan to implement IPv6, in accordance with NANC Change Order 447, which will allow Service Providers to migrate to newer IP version.

3. **Elimination of NPAC/SMS support of** non-EDR—Per SOW 86, Neustar complies with the requirement to eliminate non-EDR support for SOA and LSMSs.

In addition, Neustar confirms that the NPAC/SMS and LNPA service are flexible enough to accommodate requirements related to **all Future Considerations** listed in the NPAC RFP Section 7.2.

1. **Automation of Processes Between the NPAC/SMS and the Pooling Administration System (PAS)**—Neustar has proposed several automations for the interaction between the Pooling Administration System and the NPAC/SMS to increase throughput and reduce the potential for costly errors.

2. **Combining Steps for Intra-Service Provider Ports**—Neustar has proposed new functionality to the intra-SP porting process, including a one-step SOA Create/Activate capability which improves the processing Service Providers' large porting projects.

3. **Inter-Carrier Communications**—the NPAC/SMS architecture can incorporate the existing ICP and LSR processes (including Intermodal) into the NPAC, reducing Service Provider costs and simplifying operations. Because this would require significant changes to Service Provider systems and business rules, Neustar also recommends that the Industry explore other options for streamlining the Inter-Carrier Process, focused on future porting requirements rather than mere duplication of existing functionality.

4. **PSTN to IP Transition**—the NPAC/SMS is a critical component of U.S. infrastructure that will enable Service Providers to efficiently manage interconnection in the transition from the PSTN to IP; because a full description of the NPAC role requires a broader discussion of the environment, Proposal Section 1.5, Future NPAC/SMS Innovations, describes our view in greater detail.

5. **Future Mandated Changes**—the NPAC/SMS is flexible enough to support any required enhancements that comes as a result of regulatory mandates.

In addition to the above commitments, Neustar is also proposing to deliver a new **NPAC Portal** that unifies all aspects of the NPAC user experience into a secure, easy to navigate user interface that uses a cross-regional login. It will support all porting functions; permit real-time, chat-based interactions with NPAC Help Desk experts; provide reporting capabilities; incorporate the existing npac.com website; facilitate Industry collaboration; and much more, all in an effort to enhance operational efficiencies, ease of use, security, and facilitate access to business-critical information. The new Portal, along with Neustar's approach for the RFP's requested enhancements, is described in Proposal Section 1.2.2, NPAC/SMS Functionality.

Additional Automations to Exceed Increased Availability and Throughput Requirements

Neustar's performance against Service Level Requirements has been achieved thanks to the NPAC/SMS's redundant, scalable, 5-Layer architecture (described in detail in Proposal Section 1.2.1, NPAC/SMS Architecture), combined with hardened system monitoring and failover procedures, regular end-of-life replacement for all relevant hardware, and expert staff capable of anticipating and resolving issues before they become visible to Service Providers or consumers. The NPAC/SMS is operated with a failover capability that transfers service to our alternate site without disruption in live transaction traffic—a feat other vendors in the U.S. have struggled to achieve.

The next ten years will generate a material increase in NPAC/SMS transaction activity, and a variety of mission critical use cases. In recognition of the Industry needs, Neustar notes the RFP's requirements to increase SLR 1 availability thresholds from 99.9% to 99.99%. SLRs 5 and 6 thresholds from 95% of all transactions processed at seven per second to 99.9%, and SLR 7 thresholds for SOA/LSMS interface availability from 99% to 99.9%. We also note the new SLR 3, for Partial Service Availability (availability for even a single user). Although Neustar has

consistently performed well above these requirements over the last five years, and expects to continue doing so over the next term, we have determined that additional automation, instrumentation, and "always-on" enhancements will be required to guarantee the requisite service availability and throughput.

Security-Related Information

Our extensive experience with replication technology, failover execution, and the NPAC/SMS architecture will give us the insight to craft a stable but automated Failover capability. Prior to the start of the new contract term, Neustar will engage further discussions within the Industry forums to evaluate impacts and propose the least impactful and most beneficial approach to automation.

As for SLRs 5 and 6, Neustar consistently exceeds the current SOA-to-NPAC and NPAC-to-LSMS interface transaction rate SLRs of 95% of all transactions at seven transactions per second, with an average measurement of 99.9% of transactions meeting the requirement during calendar year 2012, across all U.S. regions. To guarantee continued performance at these levels, Neustar will pursue additional application-level enhancements that further optimize the allocation of interface processes to Service Provider connections, as well as perform continuous analysis of usage and performance patterns (including simulations in the Neustar Lab) to identify any opportunities for continued improvement. These potential investments are internal to the NPAC/SMS and will not result in any impacts to Service Providers.

Neustar's performance throughout 2012 for SLR 7 (SOA/LSMS Interface Availability) was 100%. In recognition of the Industry's raised requirements for the new term, and in response to Service Provider requests, Neustar is in the process of adding an Ethernet connectivity option, with a total of four redundant network providers connected to four different entrance facilities across Neustar's geographically diverse data centers.

Future Architectural Considerations

The enhancements described above will not impact compliance with the NAPM LLC's requirements in the current RFP, including that of synchronous replication across Neustar's geographically diverse data centers. In our continued effort to improve service, Neustar regularly evaluates new methods and best practices, and considers various alternatives with external experts. When appropriate, we share those methods and practices with the LNPA Working Group and the NAPM LLC, to jointly evaluate new ways to support U.S. Service Providers with NPAC/SMS enhancements. In light of the raised system availability SLR, Neustar has considered various means to implement the Industry's requirements for redundancy and failover, including changes to the data synchronization mechanisms across the primary and back-up data centers.

Security-Related Information

Security-Related Information

Thinking further into the future, there are additional design considerations at the Application Layer that could eliminate the need for synchronous database replication altogether. Neustar has implemented Active/Active designs in several of its commercial services, which place the burden on the Application Layer to manage failure detection and failover automation to execute high availability, data integrity, and consistency across multiple database instances and sites, rather than rely on replication technology to perform the synchronization. Moving in this direction for the NPAC/SMS would allow NPAC users to connect to either or multiple active sites at any time, improving availability and redundancy for the entire ecosystem.

As already stated, we are compliant with the Industry's requirement of ensuring synchronous replication between data centers without making the suggested changes noted above. However, in an effort to constantly improve, we believe these changes will benefit the operations of the NPAC/SMS for the entire Industry, and we look forward to engaging the Industry in discussions on this topic.

Cloud Computing

Security-Related Information

Neustar is in the process of deploying its next generation architecture known, as NexGen, to be used for all new services. NexGen allows us to streamline design, development, QA and deployment of services in public and private cloud environments, as appropriate. It uses a common baseline architecture that accommodates service-level selection of the operating system, virtualization, an API-layer and additional tools. We plan to migrate several existing Neustar services to the NexGen platform over the next few years starting in the coming months.

At the present time, the majority of cloud-based services are consumer-facing or internal business process services. Cloud technology is difficult to deploy (on available architectures) for services with required four or five nines availability, or latency of less than a few hundred milliseconds for the lion's share of traffic. Neustar believes that geographically diverse, redundant, but *dedicated* resources for database and application services are more appropriate for the NPAC/SMS than an immediate migration to Cloud technology, given the relatively constant flow of system usage and transaction demand.

Neustar has developed the procedures to determine what benefits and obstacles cloud computing offers to our customers, and over the long term we expect the majority of our services to be cloud based. We recommend that the Industry continue to evaluate the latency and reliability concerns attendant to Cloud technology over the next few years, and as they are overcome, consider the service provider implications of taking advantage of that technology. As the demand for transaction services increases with the deployment of IP networks and machine-to-machine, Neustar will continue to support the investments necessary to meet service provider requirements.

NPAC/SMS Technical Design

Neustar developed and operates the NPAC/SMS using scalability, extensibility, and security as guiding principles to ensure the system meets or exceeds requirements today and into the next 10 years with the highest levels of reliability, performance, throughput, capacity, functionality, availability. The following subsections, highlighted below, describe the NPAC/SMS in detail.

- Proposal Section 1.2.1 NPAC/SMS Architecture outlines the five Layers that comprise the NPAC/SMS:
  - Security-Related Information

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- **Proposal Section 1.2.2 NPAC/SMS Functionality** provides a comprehensive list of the NPAC/SMS' current and potential future capabilities and functionalities that we develop and maintain in partnership with the Industry.
- Proposal Section **1.2.3 System monitoring** highlights Neustar-developed and third-party systems and proactive processes in place to ensure high performance and availability of the NPAC/SMS.
- **Proposal Section 1.2.4 System Recovery and Backup** outlines the systems and processes in place to ensure continued availability of the NPAC service to the Industry in the event of an outage.

Neustar's experience and expertise as the LNPA provides a solution to the Industry that continues to deliver excellence. Our staff is dedicated to providing the highest quality service to the communications Industry. We will continue to sustain and improve our exceptional performance, and deliver new value to Service Providers, in the next term.

1.2.1 NPAC/SMS Architecture

The Industry has high expectations for immediate, secure, and available NPAC/SMS service in an environment of rapid change. Service Providers have come to expect the NPAC/SMS to operate to the same high standards of their critical network infrastructure and operations support systems.

Neustar has built our solution architecture in a modular fashion, through the efforts of our application engineers, network engineers, security engineers, database administrators, storage experts and operations staff. The solution is divided into five Layers described in this section. This allows our experts to focus on their specific area of responsibility, and allows changes to be delivered effectively and efficiently.

Neustar will continue to provide the Industry the highest levels of service they have come to expect. We will continue to improve the architecture solution to meet, exceed and anticipate the needs of the Industry as the communications landscape continues to evolve. Neustar designed the NPAC solution to be highly available, support high demand, be scalable and modular, and be highly secure. Table 1.2.1-1 demonstrates how we have architected the system to meet/exceed the requirements of the Industry.

Table 1.2.1-1. Meeting/Exceeding Industry Requirements

Requirement	Design
High availability	• Redundancy and survivability at all Layers of the architecture • Stable application software design and quality assurance processes • Robust operational practices • High quality and experienced engineering and operations staff • Platform testing at 4X production load • Automated failover processes to meet new SLR 1 requirements
High capacity	• High performance and resilient hardware and software • Immediate access to extra online capacity • Regular performance testing • Proactive performance monitoring • Adherence to ISO-certified Capacity Planning Process • Security-Related Information
Scalable and modular for new features and functionality	• Modular hardware and software design • Finely tuned hardware and software architecture • Layered architecture • Optional data fields
[redacted]	• Security-Related Information

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Monitoring, Staffing, and Processes

Preventative and predictive maintenance routines are performed weekly, monthly and/or annually based on manufacturer recommendations and Industry best practices Mechanical and Electrical system reactive and routine maintenance activities are performed using established Neustar processes and notification procedures as required. **Our continual forecast trending and analysis of capacities provide insight for predictive maintenance and future installation requirements.** Data Center personnel use Neustar cabling and labeling standards that have been developed using Industry best practices and then adapted for our unique applications and designs. We employ the use of a separate "build room" for testing, installing OS, and "burn in" of equipment before it hits the data center floor to reduce the potential for early equipment lifetime failures in production.

The Neustar Difference

Neustar has honed our competency across all areas within the Layer—data center location, security, internal mechanical, electrical, and fire suppression systems, staffing, and processes—to meet/exceed the specific requirements of the NPAC/SMS through our many years of actual operation of the U.S. LNPA service.

As shown in Exhibit 1.2.1-2, Neustar's NPAC/SMS Security-Related Information has a proven, audited track record of exceeding and far exceeding Industry-best practices. Neustar's data centers continue to score well above "Industry Best Practices" and in many cases are best in class as highlighted in our 2012 annual operations audit (required by the NPAC Master Agreement) completed by a neutral third-party auditor. In addition, Neustar data centers are included in scope for numerous audits including Sarbanes-Oxley (SOX) and SSAE16 (formerly SAS70) without issue.

Data Center Environment–Article 14 Audit Scores

Category	2008	2012	Trend
Data Center Environment Overall	4.60	4.67	▲
Physical Space	4.40	4.40	⟷
General	4.20	4.20	⟷
Racks and Placement	4.50	4.50	⟷
Division of Space	4.20	4.20	⟷
Labeling and Marking	4.60	4.60	⟷
Documentation	4.50	4.50	⟷
Electrical Elements	4.50	4.70	▲
Backup Power Sources	5.00	5.00	⟷
HVAC and Air Handling	4.80	4.90	▲
Smoke Detection	4.80	4.80	⟷
Fire Protection	4.80	4.80	⟷
Water Detection	4.80	4.80	⟷
Facilities Modification	4.50	4.50	⟷
Facilities Inspection	4.80	4.80	⟷

5 - Excellent performance, far exceeds industry best practices
4 - Above average performance, generally exceeds industry best practices
3 - Average performance, meets industry best practices
2 - Below average performance, fails to meet industry best practices
1 - Poor performance, falls far below industry best practices

Exhibit 1.2.1-2: Third-party audits validate our performance and provide valuable input on possible future enhancements.

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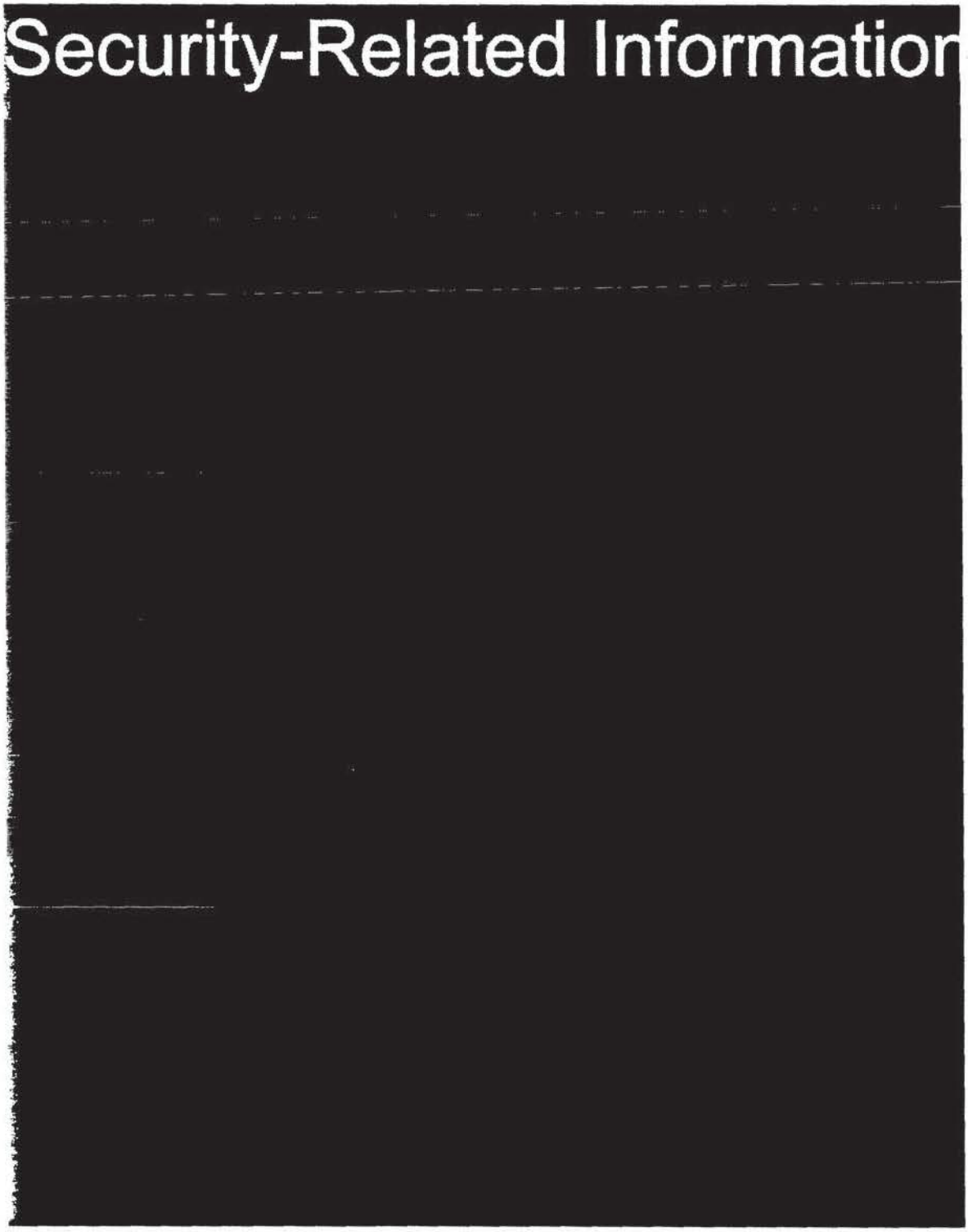

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Network Infrastructure–Article 14 Audit Scores

Category	2009	2012	Trend
Network Architecture	**4.70**	**4.73**	▲
Documentation	4.70	4.70	⟷
Documentation Maintenance	4.50	4.50	⟷
Public Addresses	4.80	4.80	⟷
Private Addresses	4.90	4.90	⟷
IP Addresses Requests	4.80	4.80	⟷
DNS Architecture	4.60	**4.60**	⟷
Internet and Customer Connectivity	4.80	**4.80**	⟷
Network Monitoring	4.90	4.90	⟷
Handling Failures	4.60	4.60	⟷
High Availability	**4.60**	**4.68**	▲
WAN Access	4.60	4.60	⟷
Firewalls	[redacted]		⟷
VPN Concentrators	5.00	5.00	⟷
Routers and Router/Switches	4.60	4.70	▲
IOS/Hardware and Maintenance	**4.70**	**4.70**	⟷
IOS	4.60	4.60	⟷
Testing	4.60	4.60	⟷
Change Control	5.00	5.00	⟷
Out-of-Band Management	4.70	4.70	⟷
Emergency Maintenance	4.60	4.60	⟷
Hardware Inventory	4.50	4.70	▲
Ticketing Systems at Neustar	4.70	4.70	⟷
Customer Notification	4.50	4.70	▲

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Exhibit 1.2.1-5: **Third-party audits validate our performance and provide vauable input on possible** future enhancements.

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The Neustar Difference

While the hardware described here is dedicated exclusively to the NPAC service, the exact same types of hardware are used for other applications within Neustar. This affords us extensive experience with these components outside of the NPAC operational environment. Consequently, our technical staff is well trained and very familiar with all the hardware components within the NPAC environment. All changes to NPAC infrastructure are first implemented within a different operational Neustar service. This way, changes are validated in a production environment before they are brought to the NPAC.

1.2.1.3.2 Four Layers of the NPAC/SMS Application Software

The NPAC/SMS Application is a very large and complex repository of application code. To help manage this complexity, the software itself is broken into the four different layers. Each layer provides a particular service or functionality within the system. Each layer is built on top of the previous layer.

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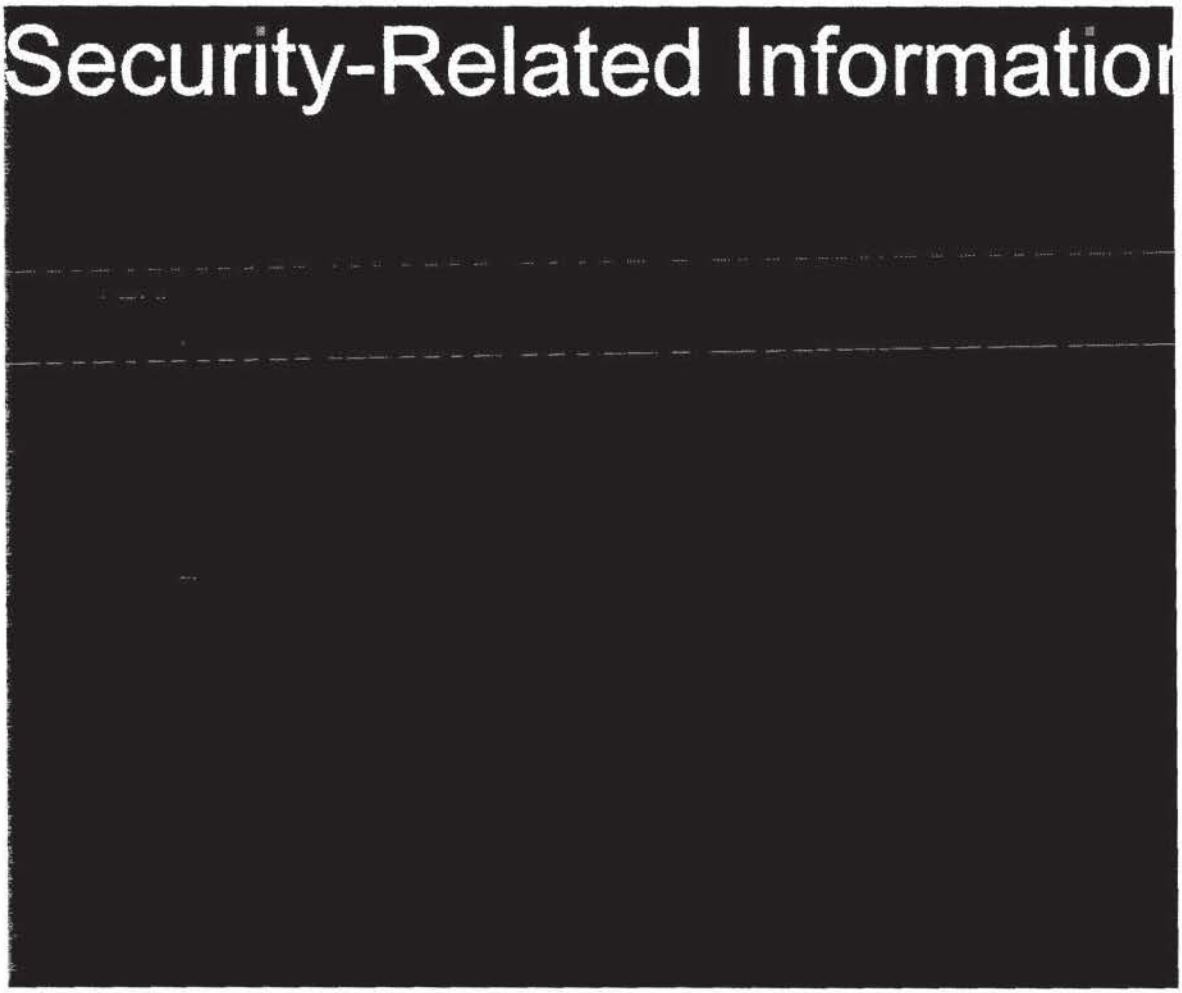

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1.2.1.3.3 Ensuring High Availability of the NPAC/SMS

The NPAC/SMS is a high availability system, consistently operating at or above 99.9% availability over the past 5 years. At the application level, several architectural and functional aspects contribute to this availability:

1. **Multi-Process, Multi-Machine Architecture**—This architecture means that, in most cases, if a process stops or if even an entire machine stops, the system continues to run.

2. [redacted]

3. **Process Management**—This feature provides NPAC/SMS-specific automated oversight of all processes, restarting a process if it ever stops. The use of shared memory allows the NPAC/SMS to retain important information that otherwise would have been lost when the process stopped.

4. [redacted]

Security-Related Information

1.2.1.3.4 NPAC/SMS Special Features

While the primary function of the NPAC/SMS is to manage information related to telephone numbers, the system offers a wide array of functionality that both complements basic transactions and improves the quality of the overall ecosystem. What follows is a brief overview of these features.

Synchronization

One of the most important functions of the NPAC/SMS is to ensure the local systems are in synch with the NPAC/SMS data. The integrity of the U.S. communications network relies on all SPs having the same addressing information, at the same time in order to properly route voice calls as well as SMS/MMS messages. To this end, the NPAC/SMS provides many different mechanisms to ensure synchronization among all communications SPs.

- Security-Related Information

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- **Bulk Data Download (BDD)—These** files provide local systems the ability to re-create or update their databases based on data extracts taken from the NPAC/SMS. BDD files are available for all types of NPAC data (SV, pooled block, network data, Service Provider, notifications). These files can be generated based on activity in a certain timeframe, or for the entire database.

- **Automated Resend**—During overnight hours, the NPAC/SMS looks for local systems that are still on the failed list for SVs or pooled blocks and resends the downloads of these objects. We designed this feature to examine previous failure reasons and if the error indicates that a modify download was failed because the record does not exist in the local system, the NPAC will broadcast a Create operation rather than a download.

- **Audits**—The NPAC/SMS queries the LSMS systems for a specified set of telephone numbers, and compares the responses to its own data. Discrepancies are noted in an audit report, and corrective downloads are sent to any discrepant LSMS systems.

Mass Update/Mass Port

Service Providers often have a need to port large volumes of numbers in a controlled manner but require assistance to manage this process. The mass update/mass port tool was developed to provide this assistance. Mass update/mass port transactions can be defined for all types of NPAC/SMS operations (create, release, activate, modify, disconnect, and cancel).

Many options are available to control the execution of the job, including an ability to control the start time and to suppress notifications that normally would be generated. Several types of reports are available to monitor the progress and results of each job.

The mass update/mass port subsystem uses a scheduler process and a system of quotas to ensure all work is done in a fair and orderly fashion at reasonable volumes. The broadcast quota system is quite complex, and considers the following aspects when running "jobs".

- Whether the job will produce SV downloads, Pooled Block downloads, or no downloads at all
- The hour of the day the job is running;
- The day of the week the job is running; and
- Whether the job is being run by a provider or NPAC personnel.

The mass update/mass port subsystem also includes a dashboard that allows administrators to determine available broadcast quota and view projected completion times for jobs.

Optional Fields

Over time, the Industry has been interested in adding new types of data to the NPAC. However, this was a difficult process, largely because changes to the CMIP interface required many resources for development and testing.

To address this issue, Neustar developed the concept of optional fields. With this feature, a one-time change to the CMIP interface was made to add a new string to several of the existing CMIP messages. This string takes the form of an [Security-Related Information] that conforms to an Industry-approved schema that defines additional data fields. With this mechanism, a new field can be added to the NPAC without changing the CMIP interface definition.

The implementation of these fields in the NPAC is done dynamically, such that adding a new field requires minimal development and can be implemented during a maintenance window.

Pseudo-LRN

Pseudo-LRN (pLRN) provides a mechanism to add records to the NPAC that do not have an LRN associated with it. By using a specially tagged LRN value, these records are identified as pLRN and are broadcast only to systems that have opted in to receive pLRN records. Providers can opt in to all pseudo-LRN records or only for pseudo-LRN records from a certain set of providers.

OpGUI

The NPAC/SMS is a very complicated system that can process millions of requests in a single day. Many of these requests have service level requirements that must be met to fulfill the expectations of our customers. Management of this system could prove to be a challenge, but Neustar has built an infrastructure that has allowed the NPAC administrators to successfully manage the system for many years. This infrastructure includes an administrative interface, called the OpGUI, which provides functionality required to configure and maintain the NPAC/SMS. The OpGUI provides the following functionality for a system administrator to manage the NPAC/SMS:

1. **Managing NPAC Customer Profiles**—provides the capability to add, remove and modify NPAC Customers, configure their tunable options, configure their CMIP network access, and establish service bureau relationships.

2. **System Administrator Reports**—provides system administrators the ability to generate reports for needed to manage and tune the NPAC/SMS.

3. **Mass Update/Mass Porting (MUMP) Management**—provides system administrators the capability to manage all mass update and mass porting jobs that Service Providers ask the NPAC to perform on their behalf. These functions include creating, removing and updating MUMP jobs, projects, quotas, and profiles, as well as generating MUMP reports.

4. [Security-Related Information]

5. **User Administration**—allows NPAC administrators to add, remove, and update accounts that grant access to the NPAC OpGUI.

6. **System Parameter Management**—allows NPAC administrators to view and update the hundreds of system level parameters provided by the NPAC/SMS.

7. **CMIP Gateway Configuration**—allows NPAC administrators to configure the processes that provide the NPAC CMIP interface. These functions include assigning provider's systems to specific CMIP gateway processes and managing the parameters associated with the CMIP gateway.

8. **Billing Collection Configuration**—allows NPAC administrators to configure the information that is collected by the NPAC/SMS for billing purposes.

In addition to the OpGUI, Neustar has also built tools that provide a real-time view into what each NPAC region is processing and how well it is handling the load. Among these tools is the [redacted] that provides a detail view into the Dispatcher Module that directs the messaging for a region. From this tool an administrator can see all messages being routed through the system and what process is working the request. Each request received by the NPAC/SMS may pass through as many as four processes. It's necessary to understand this traffic flow to ensure the NPAC/SMS is meeting the service level requirements associated with response time and SOA/LSMS interface performance.

Another administrative tool Neustar has built is the Security-Related Information . This tool provides a real-time cross-regional display of the key metrics related to NPAC/SMS performance and reliability. The [redacted] provides two columns of metrics for each NPAC region. There is a metric delta column and a metric cumulative column for each of the following key metrics.

- Monthly, daily, and five-minute SLR 3 pass, failed, and percentage passed
- Monthly SLRs 5 and 6 pass, failed, and percentage passed
- Partial failure counts for subscription versions
- Database performance including average query, rollback, and commit times
- Count of SOA or LSMS systems in recovery
- Rules engine processing active and backlog queues
- CMIP interface active queue for each SOA/LSMS
- Count of long running requests
- Machine load for the application server machines
- Count of running NPAC/SMS processes

Another key feature that contributes to our successful management of the NPAC/SMS is the multitude of **dynamically configurable settings** that control system behavior. Neustar engineers have developed this capability to make it easier to manage the multitude of options offered by the NPAC/SMS, as well as, to easily extend the service for new functionality. Settings can be defined at several different levels, including at the interface level, at the provider level, and at the overall system level. For example, we can configure the duration of medium timers at the system level, but also configure whether a particular SOA supports medium timers. The NPAC/SMS has more than

500 such settings that can be changed without requiring the system to be restarted. When a setting is changed the different modules and processes in the system automatically detect the change and make necessary adjustments. This allows the NPAC administrators that are monitoring the system to make adjustments on the fly to meet the load placed on the system each day.

1.2.1.4 NPAC/SMS Database Layer

The Database Layer is between the Application Layer and the SAN Layer. It utilizes Security-Related Information operating on high availability database servers dedicated to each region. A DBMS is a set of programs that allows one to add, modify, and delete data in a database and to query it. It also provides methods for maintaining the Security-Related Information The application servers interact with the DBMS to ensure that data stored in the SAN is up to date and accurate.

Security-Related Information

Database Layer Hardware and Software

The DBMS manages the storage of the NPAC's active and historical SV records. It also manages the storage of reporting data, logs and transient data, and data stored during the processing of a transaction.

Each region has its own Security-Related Information . Each server has 4 processors and 32 gigabytes of memory. The sole purpose of these servers is to run Security-Related Information Server product. We operate the software in Security-Related Information . is the Industry leader in providing database technology to transactional applications such as the NPAC/SMS. Each data center can fail over to the other in the event of an outage that requires this level of response.

Security-Related Information

The NPAC/SMS databases are reviewed yearly for SOX compliance to verify adequate internal control structure and procedures are maintained.

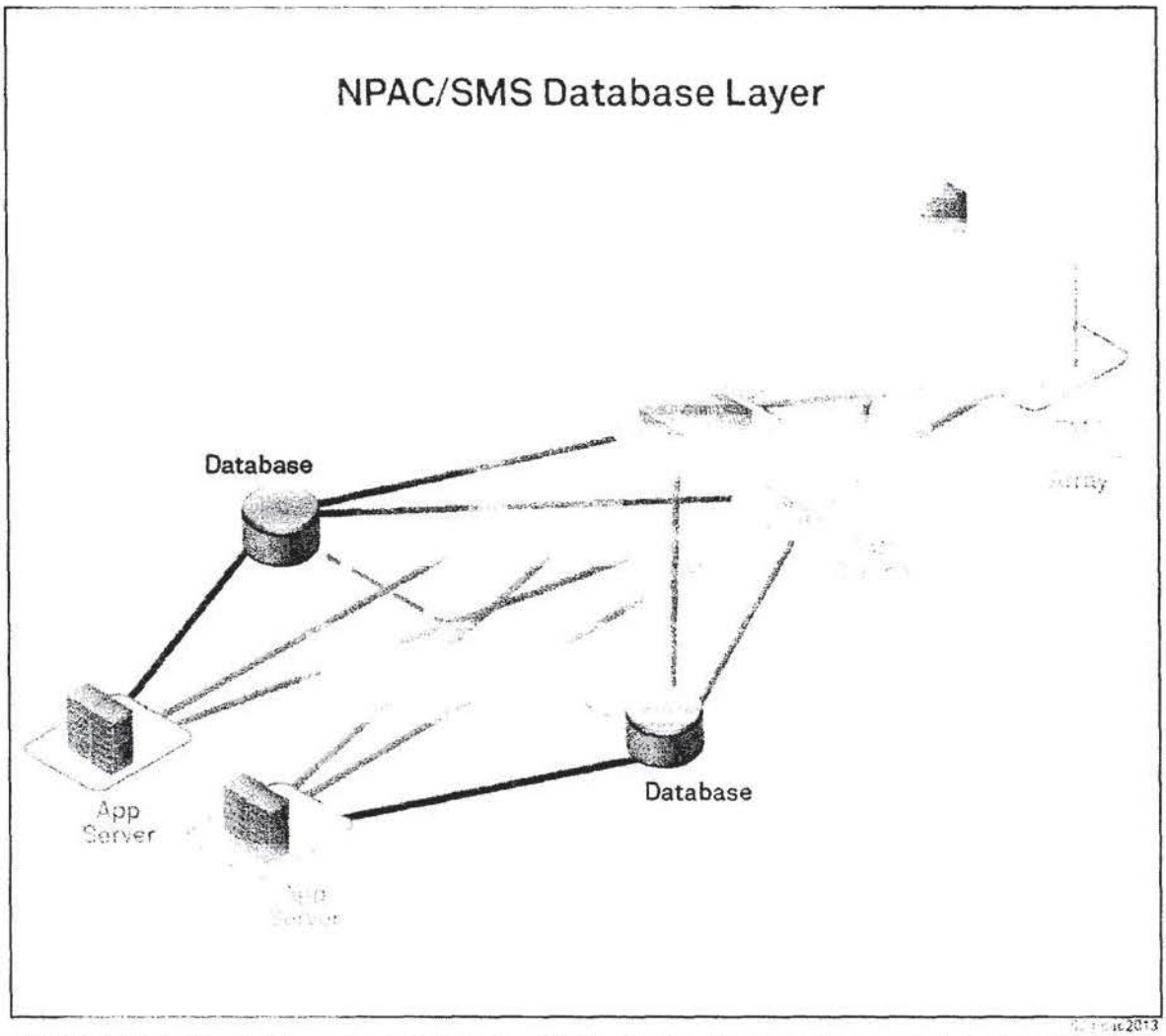

Exhibit 1.2.1-9: The Database Layer interacts with the Application Layer to ensure data stored in the SAN is up to date and accurate.

Security-Related Information

Neustar has operated the NPAC/SMS with spectacular results in consideration of SLR performance, system availability and data consistency. For the new NPAC contract, four SLRs related to throughput and response time have been increased—SLR-1, Service Availability; SLR-4, LSMS Broadcast Time; SLR-5, SOA to NPAC Interface Rates; and SLR-6, NPAC to LSMS Interface Rates. All of these SLRs are dependent on highly efficient interaction of the Application and Database Layers. We know that the system as currently configured would not consistently meet these new levels. We will have to make further changes at both the Application Layer and the Database Layer to meet the new SLRs. Given our years of experience working internally and with our vendors to improve NPAC/SMS performance, we are confident that we will be able to fine-tune the NPAC/SMS to meet these new SLRs and the high service quality that the NPAC/SMS demands

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Security-Related Information

Over the past 15 years, we have assembled a cross-functional team of network engineers, database experts, and systems architects to analyze the database traffic that comes from the database and optimize the data transmission settings at both the Network and Database Layers. Through intensive lab testing and consultation with experts from the database vendor, [Security-Related], we have been able to tune settings such as network send and receive buffers, as well as Security-Related Information to arrive at optimal settings for the NPAC's unique traffic patterns. These efforts produced dramatic improvements in minimizing the effects of the high latency imposed by the disparate databases.

Performance

Neustar makes use of many [Security-Related] features to ensure the database performs optimally. Examples include: locally managed tablespaces, automatic segment space management, automatic undo management, automatic memory management, SQL (structured query language, a language for managing data in databases) Baselines, and SQL Plan Management.

Additionally, Neustar has taken the extra architectural step to ensure high performance for NPAC users by separating out a reporting database. All the reporting workload reports requested by NPAC users such as daily Bulk Data Download (BDD) are executed against this reporting database so the performance based SLRs are met in the production NPAC/SMS database. Table 1.2.1-3 describes each of these features and their benefits.

Table 1.2.1-3. Features and Benefits of NPAC/SMS Reporting Database

Feature	Benefits
Locally managed tablespaces	Improves database performance by moving data dictionary control into the tablespace header blocks
Automatic segment space management	Provides more efficient space utilization
Automatic undo management	Eliminates the need to manually create, size and monitor the rollback segments in the database
Automatic memory management	Significantly simplifies database administration by introducing a more dynamic, flexible, and adaptive memory management scheme
SQL baselines	Ensures consistent database query performance and reduces workload on DBAs by creating consistent execution plans
SQL plan management	Provides a mechanism for maintaining consistent SQL performance regardless of changes in optimizer version, optimizer statistics, schema changes, system settings and SQL profile creation
Separate reporting database	Removes reporting load from the operational NPAC/SMS DB to ensure high performance for NPAC users

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1.2.1.5 NPAC/SMS Storage Area Network (SAN) Layer

Neustar uses a Storage Area Network (SAN) to supply disk storage for the application and database servers. For the NPAC/SMS, we have engineered and deployed a SAN specifically designed for the industry's stringent requirements.

Storage Area Network (SAN)

At a high level, a SAN provides storage in such a way that the storage appears to be locally attached to the server. The operating system communicates with SAN storage in much the same way that it would communicate with internal disk drives. Moving storage internal to the server to an external SAN provides many advantages, particularly with respect to availability, performance, and scalability. Thus, it is common for large-scale, complex applications like NPAC/SMS to use SAN storage.

Neustar's has designed the NPAC/SMS SAN Layer (shown in Exhibit 1.2.1-11) to maximize reliability, availability, and serviceability (RAS) characteristics.

1. **Reliability**—Properly instrumented storage solutions utilize self-diagnostics to provide indications of fault or problem prior to a major failure. This ensures data integrity and service performance even when an individual component fails.

2. **Availability**—Storage systems with built in redundancy allow for consistently higher uptime that is necessary to achieve four and five nine's level of availability. This allows us to predict failures and route around damaged components before any application impact occurs.

3. **Serviceability**—The simplicity and speed with which the storage unit can be maintained or repaired directly impacts uptime. A highly serviceable system is designed to be easy to work on, and automated where ever possible.

Storage Systems–Article 14 Audit Scores

Category	2009	2012	Trend
Techonology	**4.70**	**4.78**	▲
SAN Switches	4.80	4.80	⟷
EMC	4.70	4.80	▲
[redacted]	N/A	4.80	▲
	4.70	4.80	▲
Implementation	**4.60**	**4.60**	⟷
Redundancy	4.60	4.60	⟷
Configuration	4.60	4.60	⟷
Management	**4.30**	**4.30**	⟷
Administration	4.30	4.30	⟷
Maintenance	4.30	4.30	⟷
Documentation	**4.10**	**4.10**	⟷

5 - Excellent performance, far exceeds industry best practices
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Exhibit 1.2.1-10: Third-party audits validate our performance and provide valuable input on possible future enhancements.

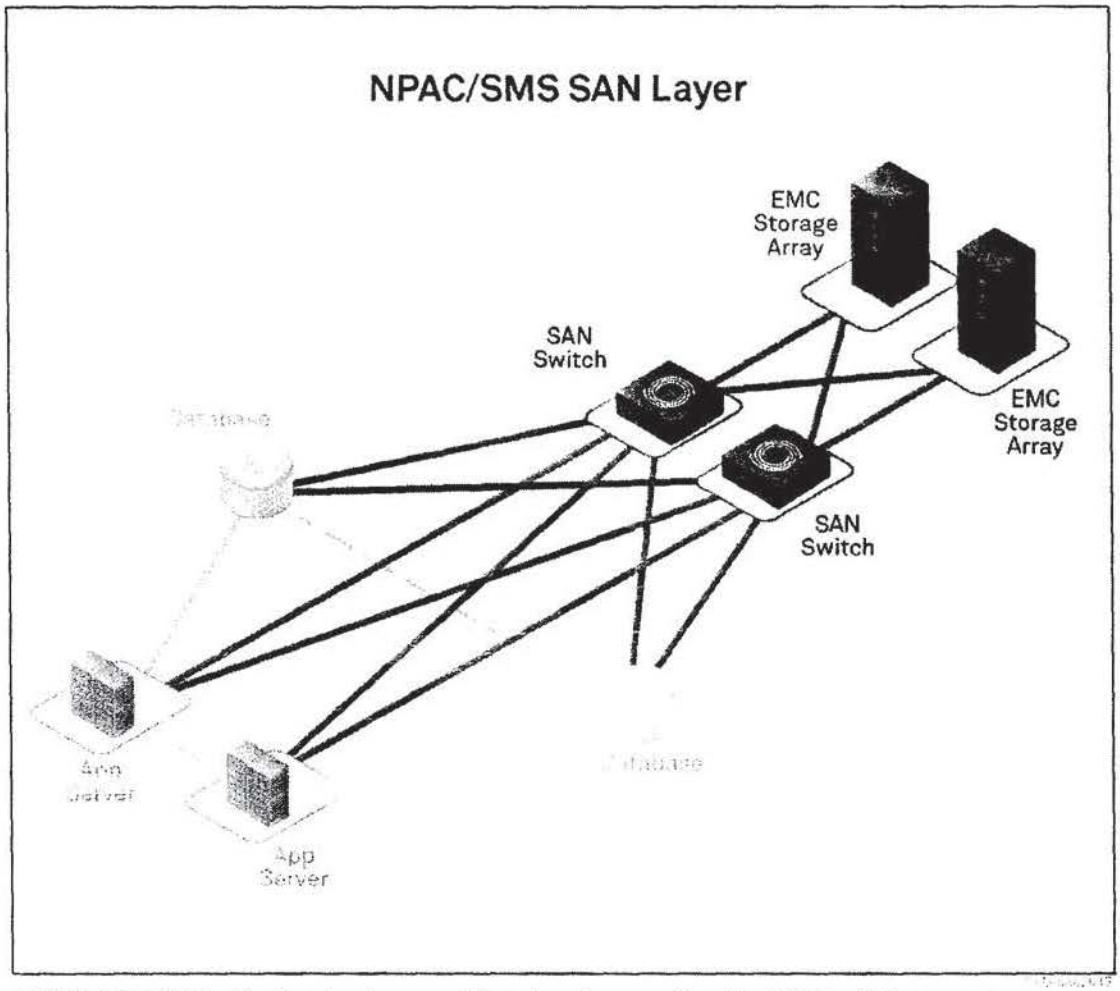

Exhibit 1.2.1-11: The Application Layer and Database Layer utilize the SAN for disk storage to ensure higher availability and stability.

The SAN Layer is comprised of two major components.

1. **Storage Arrays**—provides disk storage to all hosts in the NPAC/SMS .
2. **SAN Switches**—connects all NPAC/SMS servers to Storage Arrays

Storage Arrays

Neustar always utilizes established technologies for the NPAC/SMS. The Storage Arrays used are EMC VMAX arrays, fully dedicated to the NPAC/SMS. This technology choice provides significant benefits to NPAC users because they are:

- Fault-tolerant
- Highly scalable, should the need arise
- Extremely high-performance and predictable in response time
- Highly instrumented, providing extensive proactive and predictive failure analysis
- Supported by an excellent Field Services organization that understands highly demanding applications

Security-Related Information

Table 1.2.1-4. VMAX Storage Array Protection Areas

Protection	Purpose
Security-Related Information	
5. Highly trained, highly reliable field service organization from EMC, tightly integrated with Neustar teams	Enables repairs to be executed quickly and without errors
6. Standby power supply (batteries)	Enables controlled power off ensuring data integrity
7. Array maintenance is rigorously process driven, with continuous process improvement, following ITIL best practices.	Neustar's processes are designed to avoid and protect against human error

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Security-Related Information

Security-Related Information

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Offline Storage

Neustar uses multiple means to ensure continuous availability of the NPAC/SMS. As discussed in other sections of this document, the NPAC/SMS data is continuously replicated from the primary to the secondary data center, ensuring availability of the NPAC/SMS and guarding against data loss. In addition to using data replication to avoid data loss, Neustar also creates offline media (backup) copies of the NPAC/SMS databases, as an additional means of protecting the NPAC/SMS data. These offline copies are isolated from the primary operational systems, in accordance with Industry best practices.

The offline media copies are stored in a secure, off-site location, provided by a Tier 1 records management firm. Neustar ensures that there is a secure, auditable chain of custody for NPAC/SMS media from the time any media is created, to the time of storage in off-site facilities, to the time the media may be returned to Neustar to be restored.
Security-Related Information

Neustar performs regular test restores of NPAC/SMS data, ensuring systems and procedures are working correctly.

Staff and Operational Procedures

Neustar invests heavily in ensuring our staff is fully trained on the SAN assets for the NPAC/SMS and we employ ITIL compliant processes and procedures in managing and maintaining our SANs. The Storage team manages the NPAC/SMS SAN using Industry best practices, ensuring that all of the components are properly monitored and maintained and that new software is carefully tested before implementation. Neustar has rigorous change management procedures designed to ensure that operational changes are thoroughly planned and executed via a repeatable process.

The Neustar Difference

The SAN Layer provides extremely high-availability storage to all NPAC/SMS hosts. The arrays and switches within the SAN are highly redundant, and specifically selected to maximize reliability, availability, and serviceability. In addition, Neustar employs highly effective change management practices and procedures to ensure that the SANs have proper proactive maintenance and capacity planning necessary to meet the relevant NPAC/SMS SLRs (e.g., 99.99% availability of the NPAC/SMS).

The NPAC/SMS Storage Network Layer is audited ever year by TMNG. As shown previously in Exhibit 1.2.1-10, Neustar is consistently scored above 4.5 out of 5. A score of 4 is considered "Above average performance, generally exceeds Industry best practices" and a 5 is considered "Excellent performance, far exceeds Industry best practices".